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NOTES
AND
SKETCHES OF LESSONS

ON SUBJECTS CONNECTED WITH

The Great Exhibition.

PUBLISHED UNDER THE DIRECTION OF
THE COMMITTEE OF GENERAL LITERATURE AND EDUCATION,
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NOTES AND SKETCHES OF LESSONS

ON SUBJECTS CONNECTED WITH

THE GREAT EXHIBITION.

PART I.

HINTS ON SKETCH-WRITING.

THERE is, perhaps, no practice better adapted to ensure effective oral teaching, than diligent preparation of the lessons which the teacher intends to give his pupils. The recent impulse imparted to popular education, whilst it has directed attention to this important subject, has shown, also, how much it has been neglected. This fact, with the difficulties attending first attempts at the practice, renders it desirable to furnish a few hints to teachers and students, which may help them in this branch of their work and lead to its better appreciation.

Experience daily proves that an unprepared lesson, or, what may be termed, *EXTEMPORE* teaching, is sure to be vague, diffuse, and shallow; and on the other hand, that a well-prepared lesson is generally clear, to the point, and given with spirit and effect.

If, with all the advantages of well-disciplined minds, those who instruct adults find careful preparation indispensable, far more so must it be to those who have to teach children, and who in many cases are very deficient in mental culture.

An accurate knowledge of his subject gives self-possession and composure to the teacher, enables him

to attend to the effect of the lesson on the minds of the children; prevents tedious repetition, and important omissions; and gives him such a power over the children as to produce a consciousness that the teacher is guiding them, not they him. Success is then sure to follow, in winning their attention, and eliciting their inquiries and remarks. Moreover, the teacher who has diligently acquired, thoroughly digested, and suitably arranged his matter, will not easily be seduced from his subject by incidental association, or irrelevant questioning; he readily detects the one, and discourages the other.

Drawing up sketches also affords much salutary mental discipline to the teacher himself. He is practised in analysing subjects of instruction; and then, in reconstructing them on the principles of good teaching. He learns to view the lesson as a whole, to see the prominent bearings of the subject, and to grasp and retain them firmly whilst working them out.

Again: if a teacher can overcome his natural love of ease, and once make up his mind to the practice of preparing sketches of lessons, it will not only tend to cultivate and discipline his mind, but greatly contribute to the *pleasure* of his daily occupation, economizing at once time and labour. He will enjoy the interesting work of determining the end to be aimed at, of seeking the means of its attainment, and then of watching its success. Further: if, after having prepared the sketch, the teacher takes care, at the close of the day, to enter that sketch in a book, and to notice the omissions made, and other incidents connected with the lesson as given, he will at the end of a single twelvemonth find his task greatly lightened, and his work with every new class of children comparatively easy. His pupils withal, by the help of a systematic and regular course of well-premeditated and prepared instruction, will have their minds *properly exercised*, and make solid progress: the

same lesson will not, as is now often the case, be repeated within too short a space of time; and when it is again given, it will have the full benefit of the teacher's experience and correction.

It may seem very trite to say, that, in order to prepare a good sketch of a lesson, a teacher should thoroughly acquaint himself with the subject, both in itself and in its different bearings on relative subjects; yet much vagueness on the part of the teacher, and much inattention on the part of the children, are owing to the neglect of a truth so obvious. Whatever may be the skill of the teacher, without proper and ample materials, no valuable result will be produced.

In a Scripture lesson, the meaning of the passage selected should be carefully studied; the parallel passages and texts consulted; every reference to places, manners, customs, &c., clearly understood; that the teacher may come forward with a mind enriched with knowledge, and a heart imbued with religious feeling.

In secular instruction, the best information should be obtained from books and actual observation. The points to which to lead the pupils should be determined, whether relating to historical facts, to utility, or to the connecting dependence of one part of the subject on another. Truth, thus acquired by search, will be valued and remembered, the harmony and dependence between various truths perceived, and its existence become a reality to them.

It is of great importance that teachers should be well supplied with concordances, commentaries, and other books of reference. The scanty library of many of our teachers, whilst the mechanic is so well supplied with choice tools of every kind, is enough to make those deeply mourn who wish well to the cause of education.

The expenditure on this account would be richly repaid in the enhanced usefulness of the teacher.

Assuming that good and sufficient matter has been collected, the next point is to determine what the *special subject*, or *leading idea*, of the lesson shall be. In order to do this, in a Scripture lesson, for example, the teacher should ascertain the current of thought that runs through the passage, the particular truth it teaches, and the practical application of which it is susceptible. The advantages of attention to this rule in religious instruction, are strikingly expressed by Inglis, in the "Sabbath School." He says, "A person, when he has settled the subject of his lesson in this way, has before his eyes a definite purpose to serve. Instead of occupying himself with unconnected explanations, pious, but pointless reflections, and hap-hazard questions, he tries, we shall say, on that day and by that one lesson, to convince the children—of the value of their souls; or, of the evils of hypocrisy; or, of the holiness of God; or, of the happiness of heaven; something at least tangible and important. Instead of wandering at random wherever the impulse of association or the answers of the children may lead him, his subject is a helm to his thoughts, and guides them steadily to the point. He tries to lodge one or two great truths in the minds of his scholars; and this distinctness of purpose gives method and clearness to every part of the lesson. Both teacher and scholars know where they are, and what they are about."

In preparing the sketch of a lesson on a secular subject, the teacher should in like manner, so far as is practicable, confine himself to a single point,—or at most, a few points, towards which the whole instruction should tend, as rays to a centre. His attention should not be directed to what he can or might say on the subject, but to supply what is most suited to the children's minds and acquirements, to their present and future wants; and what they can well *receive and digest*.

The *plan, or method of the lesson*, is another very important consideration. The information which the teacher has collected is placed in his own mind, in the order in which he has acquired it, and not in that in which it should be imparted to the children. He has, therefore, to endeavour to throw himself into the minds of his pupils; to realize to himself their actual state, and to consider what is known, that he may obtain a firm footing from whence to proceed to that which is unknown and new. He has also to analyse his subject, that he may commence with what is simple and elementary, and so to arrange his points, that he may proceed, by a series of well-graduated steps, to that which is more difficult, or is complex in its character. The ideas presented or gathered from the subject will then be received in their right order, their suitable connexion felt, and the whole will be adjusted satisfactorily in the mind. He has, moreover, to determine how he should present his subject, so as to seize that point of view which is most suitable, and likely to excite the greatest degree of interest and healthy exercise in his class,—varying this, in different sketches, that he may not continue in a hackneyed course, or put the children's minds in trammels. Teachers are very apt to adopt some model in their teaching, and to wear it threadbare. They, in consequence, lose freedom of mind themselves, and their pupils become weary of travelling always by the same road. It is better to make a few mistakes, (by which, indeed, they gain experience), than lose their energy and independence of thought.

In drawing out the heads, it is of great importance that a proportionate degree of attention be paid to each, that too much be not given to the subordinate, whilst the principal are left indefinite and incomplete. Care should also be taken that the heads are ~~not~~ too numerous: minute divisions impoverish the subject, and diminish its effect. They should also be marked by *clear, distinct*, and broad lines. Teachers who

endeavour to take a comprehensive view of their subject, will succeed far better than those who bring to it a critical, fanciful spirit.

It is hardly necessary to point out that there is a great difference between a sketch designed simply for the teacher's use, and one written for the inspection of others; the object of the one is simply to suggest, that of the other to inform. In general, the former contains only the memoranda of what the teacher intends to bring before the children, in the order it is to be given; whilst the latter should contain more or less of the teacher's method of giving the lesson, and greater fulness of information.

To a teacher of long experience, who has in his own mind a well-acquired method, memoranda may be sufficient; still, method must be attended to in preparation, though it may not be essential to exhibit it in notes for his own use. He should not only know that a lesson requires reasoning, description, illustration, and application, but his own mind should be made up as to how a point is to be reasoned out, described, illustrated, or applied. The character of the matter is important, and the arrangement of it necessary; but the method of presenting it to the children is as important as either; for, as the late Dr. Mayo has well said, "it is as important *how* children learn, as *what* they learn." But for students in a training-school, who prepare sketches for their own improvement and the inspection of others, (and it is to this class that these hints may be considered more immediately applicable,) it is requisite to state in the sketch the method as well as the matter of the lesson. Information may be nicely put together, but more is needed to ensure a good lesson—the manner in which children's minds are to be exercised upon it; this should, therefore, be stated in the sketch. It is easy enough to collect information from books, but not so easy to show how such information is to be used as a

means of developing the minds of the pupils; and this is what ought to be done by a good teacher.

Method and order should by no means be confounded;—order has to do with the arrangement of the information, the raw material, as it were, of the lesson; method, with the moulding and fashioning which it undergoes in the hands of the teacher, constituting the manner in which it should be presented to the children, so as to exercise their mental powers at the right time, and in due proportion. Order deals, as we have seen, with the information—the subject-matter of the lesson; method with the mind, the development and furnishing of which is the object of the instruction. Thus, order is more concerned with the instrument used: method, with the end to be attained. And whilst order is method to a certain extent, method includes more than mere order.

In addition, therefore, to information and order, a student's sketch should show how it is proposed to introduce what is general and abstract; to help to the conception of what is absent; to illustrate what is not understood; to resolve the complex into its simple elements; and to fix in the memory that which is received by the understanding. In fine, the sketch should contain the skeleton, or outline, of the lesson, showing the principal points on which it is intended to exercise the children's attention, and the manner in which the subject should be treated, so as to secure their interest, and fix the ideas clearly and thoroughly in their minds.

A teacher, in the selection of his subject, may have a *general* aim: thus, in a Bible lesson, to produce a religious impression; in a lesson on an object, to call out observation; in a lesson on number, to cultivate accuracy and draw forth power; in a lesson on an animal, to exhibit the wisdom and goodness displayed in its structure, and thus to draw forth admiration and love towards the Divine Creator. But, in the treatment of the particular lesson, there

should, we repeat, be one, or at most two or three prominent points put down in the sketch, which should be natural, simple, and striking; it should be the special aim of the teacher to work them out. The sketch should declare the plan by which the children are to be conducted to these points: thus, in a lesson on an object, it should show how any particular idea is to be developed, or how the children are to be led to discover the fitness of the object for its use; in a lesson on natural history, how an animal's organization is adapted to its habits; on number, by what steps the children are to be induced to draw conclusions for themselves; in a Bible lesson, how it is purposed to produce an impression, and to bring a truth or precept within the sphere of the children's perception and self-application.

With respect to the details of information, a sketch, whether drawn up by a teacher for his own use in the school, or by a student in training,* should contain what may be called *suggestive hints* of the subject of the lesson. It should equally avoid detailed information, on the one hand; and on the other, mere general notices, such as constitute a table of contents, or heading of a chapter. In the former case, the document would present the appearance of a depository of information, rather than a sketch; and the teacher would himself be in danger of presenting it in a book form,—of becoming a lecturer instead of a teacher; while a sketch, if of too general a character, would either do injustice to the knowledge of the teacher, or produce a vague and superficial lesson.

The general style of a sketch should be pithy, pointed, and condensed, in order that its different parts may catch the eye. To effect this, the use of the ellipsis will contribute. Questions may also

* For examples of these two kinds of sketches, or rather of memoranda and sketch, see the memoranda and the sketch for *Lessons on the Mole*, pp. 34, 36

often be used in a sketch with effect; they aid in giving point and expression, and indicate method in the very shortest way. But it requires considerable judgment and experience to frame questions properly for such a purpose, and with due regard to the character of a sketch, avoiding, on the one hand, the minuteness required in a lesson; and, on the other, the generality of mere heads. The following example is faulty, inasmuch as the questions change by their directness and speciality the character of a sketch; whilst from their paucity they fail as to a lesson:—“I will question the children on the most important points in the narrative as I proceed; as, whom Abraham sent to fetch Rebecca? at what place the servant stopped? who came to the well whilst he was there? how did Rebecca treat him? what disposition did she manifest?” Compare this with the following extract from a sketch on “the Goodness of God, shown in the different Seasons of the Year:”—“*Draw from the children a description of this season (winter).* What do they observe out of doors?—trees without leaves, gardens without flowers, frost, snow, wind, fogs, clouds, &c. How do they feel? What do they like to have on? What difference do they find indoors?—fires required, windows shut, &c.” Here questions are used to elicit what may be called *classes of answers*, to form connecting links, and also to indicate the method of the teacher; not one of them is of that isolated or detailed character which marks each question in the first extract.

The title of the lesson should always be stated in a clear bold hand, at the top of the sketch; next, the class of children for whom it is prepared, as this information is necessary to the determining the suitability in the mode of treating the subject; then, the point of view, or the ideas to be developed: but when the point is contained in the title of the lesson, as in a lesson on grammar or number, it should not be repeated. It also gives great neatness to a sketch to

mark the heads in Roman numerals, and the subdivisions in the Arabic. A margin should be left, and the heads or leading ideas stated therein; this, besides improving the appearance of the sketch, enables both the teacher and others to see at a glance the matter and order of the lesson. A legible handwriting and neatness of execution should by no means be neglected in a sketch. These minor points may appear trivial, but they are not unimportant; attention to them will promote self-possession when giving the lesson, and tend to form beneficial habits.

SKETCH OF A LESSON TO STUDENTS IN TRAINING.

Subject—The Love of Activity in Children.

I. *Introduction.*—Elicit from the class, the feelings and purposes with which a naturalist or a farmer, a soldier or a merchant, would respectively examine the same country, and estimate its resources; or, an architect and a schoolmaster survey the same school-room; drawing the conclusion that the difference in their feelings and purposes would be owing to the nature of the ideas passing through the mind, and calling up associations peculiar to the occupation of each. Apply this to the Great Exhibition; as viewed under the influence of innumerable associations. Some, chiefly interested in the novelty, beauty, and grandeur of its architectural details; others, principally in its stock of contributions from the Fine Arts; others, finding their gratification in the development of mechanical and inventive power; while not a few, mainly occupied with its bearing on universal fraternity, industry, and peace. With the intelligent and devoted

Teacher, the object primarily and chiefly, is to discover how the Exhibition may subserve the cause of Education; and to levy contributions for future lessons and illustrations. He is led with peculiar satisfaction to examine the sculpture, developing as it does, in many cases, some of the most interesting characteristics of childhood. Among these, there are exemplifications of the *love of activity in children*—for example, the boy catching the butterfly, the boy playing with a shell, the girl with the hoop, &c.;—it is a principle characteristic and all-pervading, and one that gives the unskilful teacher not a little trouble and perplexity.

II. *Mottos*, or the leading ideas on which the lesson is to be conducted, and which are to be committed to memory at the end of the lesson.

1. The mind of the child is never idle—the teacher's business is *properly* to employ it.
2. Love of activity is not to be confounded with love of mischief.
3. Nature abhors a vacuum. If the mind is not occupied with good, it will be with evil.

III. *The principle of the love of activity exemplified.*—By means of either single questions, or a series of questions, get the students to describe what an infant first does, or takes pleasure in, as, in the exercise of its limbs; in sights, as light or bright colours which stimulate its observation; and in sounds lively and cheerful, which set the observation in operation. Let the class also point out how the love of activity is manifested as the age advances, in acquiring the power, step by step, of locomotion: first, he crawls; next, he stands upright and walks from one chair to another with help; and finally, he attains the delightful power of walking about alone. The child also begins to distinguish things; is daily increasing the circle of objects known, first, recognising them when he hears their names; and next, applying the names to them.

The amusements too of children strikingly prove their love of activity;—as, running, jumping, gardening, beating a drum (illustrated by the “boy and the injured drum”), cutting, playing “at horses,” &c.

Activity of mind also is evinced in the close examination which a new object undergoes; in the delight experienced in turning it about, and in pulling it in pieces, to examine the construction or contents. Everything they see done by others excites their powers of imitation. The mother is sewing, or the father making black lines, and as soon as means can be had, the child will be found at the same occupation. How strong too is the love of construction! Paper and other materials are, with the greatest pains, collected “to build a house.” Never, indeed, are children so happy as when their bodies are actively employed.

Next, help the students to trace the source of the pleasure derived from such activity. The infant seems to have pleasure simply in the exercise of its senses, as they open upon a world new to it. There is a delight in the use of every power as it comes into being. The exercise of a power follows the innate consciousness of its existence, and is the source of lively satisfaction. By eliciting what they themselves have observed, lead the students to discover and appreciate the twofold use of this love of activity implanted in children. 1st, The constant exercise it produces strengthens their organs and develops their powers. 2dly, The constant exercise of their senses on the material world, is the appointed means for making them acquainted with it, and of storing their minds with ideas. How wonderfully is the mind constituted even in this particular!

Is it possible to doubt the goodness, or to be blind to the wisdom of God in conferring this disposition on children, by which the most simple events, even the necessary actions of life, are all sources of the *greatest joy*, and means of lasting improvement?

That this activity which leads to the constant exercise of the senses, is the first step in the infant's education, the students will be led to infer from noticing the erroneous judgments first formed by children—for example, in snatching at things far beyond their reach; from their imperfect ideas of sounds, as to whence they come or what they mean: a little exercise teaches them to direct the hands aright; to know whence sounds proceed; to distinguish particular noises, and to recognise the tender parent and the kind nurse.

IV. *Application to the Teacher.*—The students should next consider the use they have to make as teachers, of this characteristic of childhood, and so follow out the evident intentions of the All-wise Creator. They must provide suitable exercises for the organs, that the body in all its parts may be developed and strengthened, and health, vigour, and dexterity promoted. God has given the necessary organs for the child's well-being, and a desire to exercise them; and there remains for the teacher only to watch over, direct, and regulate. The senses must be trained to accomplish their offices effectually, by presenting and surrounding the children with such objects as will exercise them profitably.

Lead the students to observe that, though activity is the child's delight, it is very difficult to sustain it *long* in one direction; children flit from object to object with restless eagerness: therefore the task of the teacher is to arrest attention, and keep alive the interest till clear and distinct ideas are gained. The teacher has to lead the children to observe carefully, and then to describe correctly, what falls under their notice; and the inherent love of activity is the means of accomplishing this.

Draw also from the students how the operation of the love of activity differs as the age increases. The little one who can just walk, drawing his empty cart along, is made happy merely by the noise which it

produces. Another, a little older, must have a doll to ride in it. A third, still older, will attribute to the doll a character, and make it act a part. Whilst one yet older will fill the cart with grass, sand, or straw, in imitation of rural occupations. The first child is prompted by a simple love of activity; the second and third combine with it imagination, and this forms an element of the pleasure; whilst the fourth adds the idea of utility. The work of the teacher is evidently to find food for the craving of activity, in its several stages.

THE BIBLE.

SKETCHES FOR SEVERAL LESSONS TO BE GIVEN TO CHILDREN
BETWEEN TWELVE AND FIFTEEN.

HAVING drawn from the class by a few direct and simple questions, that the Bible was not always a printed book—was not first written in English—was not bestowed on mankind at once, complete from Genesis to Revelation, but in detached parts; and having told them to consider the successive portions in which it was given, the languages in which it was first written, and the form in which it then appeared; the children ought to be in possession of most of the facts referred to: therefore, during the greater part of the lessons, the business of the teacher would be to lead them to collect and arrange what they already know.

I.—*Scripture, in what portions given, and at what periods.*

1st. Possessors of Scripture, the Hebrew nation—Not when we first recognise it in Egypt, but previous to the settlement in Canaan—Date of this event—

At that time the Israelites had the writings of Moses, probably including one or two of the Psalms, and the Book of Job—Thence to the first Captivity, they received successively the Books of Joshua, Judges, Samuel, Kings, Chronicles, the writings of David, those of his son, a portion of the greater, and most of the lesser Prophets—Date of the Captivity—During that period, the remainder of the greater Prophets, and two of the lesser Prophets—After the Return, the narratives of Ezra, Nehemiah, and Esther, with the three last prophetic books—Date of the Return.

2d. Books of the New Testament period—Also considered with respect to writers, titles, and order—Date of conclusion of Scripture. Text learned: Hebrews i. 1, "God, Who at sundry times, and in divers manners, spake in times past to the fathers by the Prophets, hath in these last days spoken unto us by His Son."

II.—*Language—That in which Scripture was first written—Translations:*

1st. Every revelation prior to the date of the first Captivity made in Hebrew—This accounted for—Books of Daniel and Ezra written partly in Hebrew and partly in Chaldee—Lead the class to infer the probable reason for this, from consideration as to the subject of the portions written in Chaldee; principally such as include original letters, decrees, &c. of the Babylonish and Persian Governments—Scriptures posterior to the date of the Captivity written in Chaldee, and all the earlier books translated into the same tongue—No sooner did the ancient Hebrew become a dead language than the Scriptures were put into the vernacular tongue by men, such as Ezra, acting under the immediate inspiration of God—Conclusion drawn from this, and text learned, showing the importance of understanding the Word of God.

1 Cor. xiv. 19. "I had rather speak five words with my understanding, that by my voice I might teach others also, than ten thousand words in an unknown tongue."

2d. The coming of the time in which the Gentiles were to be led to a knowledge of the truth, marked by the dispersion of the Scriptures among them—Providence of God shown in this—Its design and effect—Give general account of various translations, and particular one on the Septuagint—Refer to, and prove the importance of, the last translation—Refer to prevalence of the Greek tongue in every part of the civilized world, as connected providentially with the publication of the Gospel in that language.

To connect this period with what follows, touch very briefly on the general professions of Christianity—Division of the Roman Empire, and subsequent spread of the Greek and Roman Catholic Churches—Progress of the latter—Extent of her power—Change with respect to the language of the Bible—Scriptures written in Latin throughout all the countries of the Western Empire.

III.—*Forms under which the Scriptures have been presented at different periods.*

1st. Derivation of the terms Bible and Scripture—Sacred words of the Jews' writings—Not books—Kind of material chiefly used, either parchment or vellum—Scroll; when not in use rolled up on a slender cylinder like a school map,—hence origin of the term Volume—Refer to the Scribes; their office—Importance and accuracy of their labours.

2d. Describe sacred records of Christians in the Middle Ages—Illuminated MSS.—What they were—Why so called—Sometimes rolls; oftener books—Beauty and value of these copies—The copyists; *what class of men they were*—Their mode of life,

position, and character compared with that of the Jewish Scribes.

3d. Sacred records in the modern form—Class observe their own bibles, and state how they differ externally from those before described—Why composed of many sheets bound together, not of one rolled up—Why made of paper rather than parchment—Why no longer MS.—Give brief account of the invention of printing, and its immediate consequence—the great multiplication of copies—Effect of the distribution of these, especially in England—Specimens of Scriptural translations in 148 languages, to be seen at the Great Exhibition—Compare God's present method of making known Himself and His will, to that He adopted in the apostolic age. Then, supernatural gift of tongues, enabling the Apostles so to preach that all could understand.—Why necessary then—Now, the same object effected without a miracle, by the translation of the Bible into different languages, so that the nations may still say, "We do hear them speak in our tongues the wonderful works of God." Acts ii. 11.

IV.—*Unchangeableness of the Inspired Word.—Its influence.*

Bible to be regarded as a perfect whole—The New Testament not an abrogation, but a development, of the principles contained in the Old. Text, Matthew v. 17, 18. This might be proved by reference to the nature of God, but is evidently seen by the invariable influence of the Scriptures on the condition of man in all ages and countries—Compare the mental and moral condition of the Jews prior to their first Captivity, with that of the nations surrounding them—Refer to countries in which the Bible is unknown at this day; without exception, utterly barbarous and degraded—Refer to countries in which its doctrines are rejected, and yet, because the people have learned

something of the historical events recorded in it, because its precepts (though their origin is not recognised) are interwoven with social laws, they take a far higher rank—Instance, Mahometans—Refer to countries in which the Scriptures are held to be true, and the people do not read them, because the ecclesiastical power has put a seal on the book; these are better off than those before named, for they hear of the name, and know somewhat of the character, of Jesus, and through the thick mists of tradition the light of the Word will sometimes shine.

Conclusion drawn—That the Bible is a great engine of civilization, as well as the source of spiritual knowledge—Effect of its free circulation throughout our own land—Refer to the renovation now commenced in Ireland, from the spread of the Scriptures and Scriptural teaching—Duty incumbent on us to place the Bible in the households of our own and other countries—We may anticipate the promised blessing, that they who water others shall themselves be watered.

"THE GATHERING OF THE NATIONS."

INTENDED FOR STUDENTS OR ADVANCED PUPIL TEACHERS.

LESSON I.

WHEN at the Crystal Palace, seated by the transparent fountain, the teacher should draw the attention of the pupils off from the machinery, manufactures, statuary; and, in short, apart from all the inanimate objects; and desire them to observe the people, committing to paper the results of their observations, to be compared upon their return home.

The varied forms of the features—The different modes of dress—The dissimilarities in point of age and stature—The refined manners of some, and the

less prepossessing appearance of others—The careful examination and expressed admiration of a grand statue, or splendid piece of needlework, by *one* wearing the index of an intelligent mind—the hasty glance or total disregard of the same by *another*, who, unaccustomed to fixed attention, passes from object to object, as a butterfly flits from flower to flower;—would doubtless attract their notice, and call forth their remarks; whilst, in all probability, one or more of the party would be struck with the number of foreigners, representing, with few exceptions, all the known nations of the earth.

The Gathering of the Nations being the striking peculiarity selected for consideration,

I. Require the pupils to point out, on a map of the World, the different localities of the nations represented in the Great Exhibition by their productions—With a few words on the religion, customs, &c. of each people. By thus doing, such a large proportion of the habitable and civilized portion of the globe will be distinguished, that they must all readily perceive how this extraordinary meeting of strangers may, with the utmost consistency, be denominated “The Gathering of the Nations.”

II. Refer to former “Gatherings of the Nations.” As on the approach of Alexander the Great to the ancient city of Babylon, B. C. 324. He was met by embassies from nearly every part of the world; who had come to pay their respects to the new lord of Asia, from Carthage, from South Italy, from Europe north of the Black Sea; by Celts, and Iberians also.

Contrast the object of this gathering, with the purpose for which the nations of the earth are now assembled—The ancients, half-trembling, united to applaud a man, who by war and bloodshed facilitated the extension of commerce, science, &c.—We are met under the direction, patronage, and protection of a noble and loving Sovereign; who not only encourages and rewards industry, but whose ambition is to unite

with the silken cords of peace the four quarters of the globe; and who is at the head of her loyal subjects in ascribing "Praise unto Him to Whom all praise is due." "The earth is the Lord's, and the fulness thereof." He has made it to abound in riches, and has endowed man with faculties capable of using those riches to his advantage, comfort, and happiness.

At one period of Earth's history many of her nations united in one common cause, and set out as Crusaders, to recover the desolate tomb of a dead Christ, instead of going forth to preach the risen glory of a living and interceding Saviour.

On frequent occasions have the nations of the earth gathered in countless crowds for war—Instances are familiar and need not be enumerated—Merely require the mention of one in the reign of George III., when the allied armies of England, Prussia, Russia, Sweden, Austria, Holland, and Denmark invaded France.

III. By questions and comparisons lead the pupils to infer the probable results of the present "Gathering of the Nations;" and England's duty, as the nation blessed with the largest amount of spiritual light and influence.

1st. A more intimate, friendly, and extended intercourse, which must tend to remove misapprehensions and prejudices.

2d. An invigorated desire to progress and excel—The latter should spring, not from a spirit of rivalry, but from a deep sense of the value of excellence.

3d. A wider diffusion of general knowledge—Many things hitherto only heard of may now be seen and understood, not only by the learned, but also by the unlearned, though not to the same extent.

4th. Since no individual is so insignificant as not to exercise some influence, unconsciously, if not consciously; we, a people at home, must be influencing, either for good or evil, the strangers among us; they *will return to their respective homes*, not as they

came, but the better or the worse for their visit to England.

5th. Contrast our Sunday! (desecrated as it is) with a Sunday in other parts of the world—The foreigner will be forcibly struck by finding the places of amusement shut on that day; and even the gates of the Crystal Palace closed against him.

6th. Our religion should be seen in its effects, and recommended by the same—We should be a nation remarkable for its love to God and man,—its unity, peace, and loyalty.

To all of us, as a nation, and to each of us, as individuals, the text addresses itself—"Let your light so shine before men, that they may see your good works, and glorify your Father Which is in heaven."—Matt. v. 16.

LESSON II.

I. ACQUAINT the class with the subject of the lesson; and desire them to mention any gatherings of nations of which they remember to have read in the Bible.

By questions and reference to passages of Scripture direct their attention to—

1st. The *gathering* at the building of Babel. Gen. xi.

2dly. The Pentecostal *gathering*. Acts ii.

3dly. The *gathering* of Antichrist. Joel iii. 2; Isaiah xxiv. 22.

4thly. The *gathering* before the "great white throne." Rev. xx. 11—13.

(These to be written on the large slate.)

II.—1st. *The gathering at the building of Babel.* Let the pupils read the account, Gen. xi.—Question as to its immediate consequences—The confusion of tongues, and necessarily the impossibility of continuing the work for which the multitudes had gathered

—Why this act so severely punished?—Anything wrong in building a city and an elevated tower?—Not when men's motives are in accordance with God's will—The nations assembled on the plain of Shinar were acting in direct opposition to the design of Him who had said, "Replenish the *earth*"—compare Gen. ix. 1, 7, with xi. 6.—God's will was that man should separate, and people the whole globe; man's will was that they should keep together and make to themselves a name—Though in possession of no written revelation, what must they have learnt of God from His dealings with the antediluvian world?—What folly then for them to endeavour to defeat the purpose of the *Almighty*—They might have expected that "He Who sitteth in the heavens would laugh; that the Lord would have them in derision"—Lead the class to see the more remote consequences of this sin—The many languages have been great impediments to the propagation of the Gospel—Instance the Chinese, and speak of the difficulties which our missionaries experience in learning that peculiar language. Every foreign tongue we hear should remind us of the danger of opposing God's will, and excite us to pray for the time when that promise shall be fulfilled, "I will turn to the people a pure language, that they may all call upon the name of the Lord, to serve Him with one consent." Zeph. iii. 9.

2dly. *The Pentecostal gathering.* Acts ii.—Question on the *object* in view in this gathering—On the part of the Apostles—To wait for the promise made to the fathers of the outpouring of the Holy Spirit, in obedience to the command given. Luke xxi. 49; Acts i. 4, 5.—On the *result*—The apostles were filled with the Holy Ghost; and miraculous powers were bestowed upon them—What was the object in this gathering on the part of the multitude?—Devout Jews out of every nation met at Jerusalem to keep *the feast of weeks* in obedience to the command of

the Lord; Lev. xxiii. 15; Deut. xvi. 9—By contrasting this purpose and result with the design and consequences of the gathering at the building of Babel, the class may be led to observe, that in one, disobedience and punishment were the chief features; in the other, obedience and reward. Those who followed the desires of their own hearts God visited with wrath; those who were in the way of His commandments He rewarded with His blessing—Require passages of Scripture to prove that this is God's usual way of dealing with the inhabitants of earth. Deut. xi. 26—28; 1 Kings ix. 4—9.—What lesson should this teach the nations assembled in England?—Have they met, not to get a name to themselves, but to ascribe praise unto Him who has so graciously and beautifully furnished the earth with everything that man could desire? If so, they may expect this gathering to issue in happy and blessed results.

3dly. *The gathering of Antichrist.*—Refer the pupils to the gathering mentioned, Joel iii. Direct their attention to the time when it shall take place—Christ's second advent. Joel ii. 31, 32; iii. 1, 2.—Also to the purpose of the Lord in assembling the nations, as clearly seen throughout the chapter. Inform the class that the general interpretation of "my people" and "Israel," in ver. 2, comprehends the faithful of all ages: and that the judgments denounced upon the enemies of the spiritual Church in Joel, are the same as those awaiting the Babylon of the Apocalypse; Rev. xiv. 8; xvi. 16—19; xvii. 5, 6.

God's "determination is to gather the nations." Zeph. iii. 8. Were He now to assemble those who are anti-christian, how inconceivably large would be their number! We know not how soon He may do so—The inference drawn as to our duty to those nations—We should by our money, prayers, example, and active exertions, endeavour to rescue some of them—England now has a peculiar opportunity of

recommending the doctrines of her reformed Church to the various nations with whom she has come in contact, by her just dealing, temperance, respect, courtesy, hospitality, loyalty to her Queen, fidelity to God especially shown in reverence for the Lord's day.

4thly. The *gathering before the "great white throne."* Rev. xx. 11—15.—First, by questions and comparisons lead the class to remark the peculiarities of this last gathering—It will be emphatically "*the gathering of the nations*"—All shall be there; neither shall their presence depend upon their own will—The purpose of their meeting cannot fail to be fully accomplished; the books opened, every man will receive according to his works—The results, never to be changed by a subsequent gathering, will extend through eternity—The Judge, seated on the "great white throne," will include all in two parties; one having their names written in "the Lamb's book of life," will enjoy inconceivable and never ending bliss; whilst the other will be sent away into everlasting misery.

In which of these two divisions shall we be found? That we were born of Christian parents will profit us nothing, if we have not "walked worthy of the vocation wherewith we are called."

SKETCH OF A LESSON ON THE MASSACRE OF THE CHILDREN OF BETHLEHEM.

INTENDED FOR CHILDREN OF NINE OR TEN YEARS OF AGE.

I. *Statue examined.*—Get the children to examine the statue, telling what they see; as, a man—a woman—a child. The man looks strong and fierce, holds a knife or dagger in one hand, a child in the other by one of its legs—The infant seems frightened, its mouth is open; it is crying—The woman is kneel-

ing at the feet of the man, stretching out her arms towards the child; she looks frightened and imploring. What does this mean? What does it appear the man is about to do with the infant? Why is the woman so imploring?

Thus introduced, endeavour to make the children picture to themselves the distressing scene recorded in Matt. ii. 16—18: how wretched the poor mothers must have been to see their helpless infants torn from them, and murdered before their eyes, by brutal men sent for that purpose—and probably in every house a murder; expressed in the language of Jeremiah, “lamentation, and weeping, and great mourning.”

II. *Narrative told.*—Here read or detail to the children the circumstances that led to this general massacre of poor unoffending babes, questioning them, to ascertain that they are following the teacher. The wise men’s visit—They apply to Herod for information as to the birth-place of the King of Israel, who hears them with astonishment—He consults the scribes, who point out Bethlehem as the place of Messiah’s birth—He is moved with jealousy, fearing that his throne will be taken from him—Under a mask of hypocrisy he directs the wise men to find out the new-born Prince, and requests them to return to him with tidings, that he may go and worship Him also—An angel tells them to return to their own country another way—Herod’s disappointment—He orders the slaughter of all the children of a certain age, both in Bethlehem and the neighbourhood, that amongst them the Saviour might fall—With fearful exactness his commands were carried out—An example of which we see in the statue before us.

III. *God’s Providence.*—Lead the children to consider how God overruled Herod’s wicked design, and preserved the infant Jesus. What did Herod think he had done?—Defeated the indications of the star, and accomplished his own will in opposition

to that of the Almighty. But had he done so? Remark that whatever crafty cruel devices were in his heart, the counsel of the Lord must stand.—This event formed another accomplishment of the words of the prophet Jeremiah, (xxxi. 15—17.)—Thus, also, the date of Christ's birth was publicly marked, and all others who could have pretended to be the Messiah, as having been born at Bethlehem about the same time, were cut off. Lead the children next to see that Joseph knew neither the danger the Child was in, nor, if he had known it, was he aware of any way to escape; but an Angel appears and tells him of both—"Take the young Child by night, and flee into Egypt"—Thus the infant Jesus was rescued—How vain is it for man to contend against the Almighty!

IV. *Practical application.*—Direct the children, by questions, to observe the main ideas in the preceding parts of the lesson, and to make a threefold application: 1st, What the cruelty of Herod suggests; 2dly, What the workings of God's providence; 3dly, The preservation of the infant Jesus.

1st. From the cruelty of Herod we learn to what lengths wicked men will go, when they give way to evil passions, and how guarded we should be against envy and jealousy.

2dly. From the workings of God's overruling providence, we see how He can thwart and baffle the wicked designs of men, and make their wrath to praise Him.—But can the Messiah, Who is to be the consolation of Israel, be introduced with all this lamentation? Yes; 1st, for so it was foretold; and 2dly, if we look further, we shall find that the weeping in Ramah was but a forerunner to the greatest joy; for it follows, "Thy work shall be rewarded, and there is hope in thy end:" "unto them a child was born" sufficient to repair their losses.

3dly. From the preservation of the Saviour, we learn the security of God's people, which may be also

seen in the case of David, who said, "I will not be afraid of ten thousands of people that have set themselves against me round about."

ON THE "TEMPTATION OF EVE."

THE STATUE SEEN IN THE SCULPTURE ROOM OF THE EXHIBITION.

LESSON TO BE GIVEN TO A CLASS OF CHILDREN,
FROM EIGHT TO TWELVE YEARS OF AGE.

I. At the commencement of the lesson the teacher should tell the children that we have Scriptural warrant for knowing that Satan appeared not as a man to Eve, but as a serpent; but probably he is represented by the sculptor in the form of a man to help our ideas, as he can hardly imagine a serpent possessed of language—But let us attend to Holy Scripture rather than sculpture. The teacher, having explained this, should speak to the class of Eve, leading those who have their Bibles to read her history from Genesis—How and by whom she was created—In what state—With whom placed—Where she was put—What kind of place Eden was—Her many enjoyments—How she should have felt towards God, who had surrounded her with such blessings—What command was given—How she should have regarded the command.

II. Speak of the tempter—His art and cunning—The many devices used by him to effect his object—Speak of his former state—Contrast it with his present—His feelings towards God—Lead the class to see that hatred to God would induce the devil to plan man's ruin, as by working out that end he would mar one of God's fairest works—His cunning—Did not go to the man, knowing that Eve was the weaker of the two—Did not at first ask her to commit the sin, for then the enormity of the act would have caused her to shrink from the transgression—He came as it were to seek information: "Yea, hath God said, Ye shall not eat of

every tree of the garden?" yet, by his very question he was artfully infusing doubt—He then made her feel dissatisfied with what God had given her—Made her think that the command of God was severe—He appealed to the lust of the flesh, for "the woman saw that the tree was good for food"—To the lust of the eye, "the woman saw that the tree was pleasant to the eye"—To the pride of life, "the tree was to be desired to make one wise."

III. *Application.*—Children should be guarded against the wiles of the evil one, and should be led to see that he has plans suited to all our failings—He knows how to treat every kind of disposition—If we are proud, he makes us discontented with our position in life—If fond of pleasure, he not only opens a course of sinful pleasures to us, but tempts us to think God severe in not allowing us to join in them—There is no means which he does not try—Therefore we must be watchful, not only of committing great offences, but what we think little ones too, as the latter frequently lead to the former.

SKETCH OF A LESSON ON THE COVERING OF BIRDS,
AND ITS ADAPTATION TO THEIR WANTS.

FOR CHILDREN UNDER TWELVE YEARS OF AGE.

I. In order that the children should determine what is necessary in the covering of birds, refer to their *habits*, motion, and the *element* in which they move; and from a consideration of these, lead them to deduce the necessity for *great* warmth; by comparison of the blood of birds with that of other animals, speak of the rapid changes of temperature to which they are exposed in passing from one country to another—in ascending and descending in the atmosphere. (Instance *Vultures*.) The vulture descends from the limit of perpetual snow to tropical plains in a few moments. Also, call attention to *their long and sustained flight*—the energy they pos-

sess in consequence of their quick circulation, which is the cause of the warmth of their bodies—and how their covering prevents it from escaping.

Great *strength* combined with *lightness*.

The children led to see why the feathers should be strong, by reference to the organs of flight—Why light and also smooth, by reference to the element through which the bird moves.

II. *Examination of the structure of a feather.*—Children name and describe the parts of a feather—The quill or barrel—The shaft—Vane, or beard—The qualities of the quill mentioned—*Lightness*, result of form—A hollow cylinder much stronger than if the same quantity were made into a solid cylinder—(This fact proved by Professor Cowper on the reed-like columns of the Great Exhibition)—Should be illustrated to the children by comparing the weight borne by a hollow cylinder made of a piece of paper, with the weight borne by the same piece of paper made into a solid cylinder.

Strength.—Composed of two sets of fibres, one acting longitudinally, the other circularly—Effect of this—A quill cut up, and children shown that the latter set are scraped off before making a pen, the former separated by the slit.

The *shaft* examined and described. — Lead the children to see how the form adapts it to the shape of the body—Speak of the manner of flight, and show the necessity of the groove and curve beneath, in striking the air; and of the great strength above, necessary to resist the stroke.

Vane, or beard.—Examined—Of what composed—Shape of the barbs, and their position with respect to the shaft—Their arrangement with respect to each other—Why the flat sides are turned towards each other, and edges upwards and downwards—A large unruffled quill presented, and the children shown that the barbs are firmly held together—When pulled asunder, they again unite on being smoothed—How

is this?—Mention with what each barb is provided—Position, office, and use of barblets—Call attention of children to the beauty of this complicated arrangement, by supposing the beard formed of a single piece, or the barbs glued together—The consequence in either case?—An injury once sustained could never be repaired by the bird—How the bird restores any feathers unfitted for flight through the violence of a storm, by contact with prey, or other accident.

(What has been said here refers chiefly to the feathers of the wing and tail.)

Children led to see how admirably the structure and arrangement of the body-feathers are adapted to secure the warmth required for the bird.

The feathers of the body compared with those of the wings, and the class led to observe how each part of the former is modified to suit a different purpose. Refer to the swan, to show the provision made when *great* warmth is required—Direct attention to what are called warm substances—They are non-conductors, and prevent the escape of heat—How feathers effectually accomplish this for the bird.

Arrangement of feathers in wings and tail—Wind can scarcely ruffle them.

Refer to the goodness and wisdom of God in the beautiful adaptation of structure to wants, and call for a suitable text.

SKETCH OF A LESSON ON THE ADAPTATION OF FEATHERS TO THE HABITS AND WANTS OF BIRDS.

FOR CHILDREN UNDER TWELVE YEARS OF AGE.

I. THE OWL.—*Habits and food.*—Call the children's attention to the habits and food of the owl.

1. *Habits.*—Nocturnal, passing the day in obscurity, but on approach of evening coming forth in search of prey.

2. *Food*.—Mice, and other small animals, which are naturally very timid, and likely to be disturbed by the least noise, therefore only to be approached with great caution.

II. *Adaptation of plumage*.—Refer to the noise usually made by birds in flying—how prevented in case of the owl? Plumage of owl examined, and the children led to see that the feathers are soft, loose, downy, yielding to every breath of air.

Wings provided with quill feathers deficient in strength and elasticity.—Children led to deduce the necessity for this, by reference to the nature of the animals on which they prey.

Extent of wings compared with the body.—Children led to see the provision made to prevent tardiness of flight.

The edge of the outer feather of the owl compared with that of a pigeon, or any other bird, for the purpose of showing how admirably they are modified to secure noiseless flight.

II. The King-fisher. — Direct attention to its locality and food.

1. *Locality*.—Inhabits the margins of lakes and rivers.

2. *Food*.—Preys on small fish. The manner of obtaining food described, and the children led to see the kind of plumage necessary to resist the action of water during its sudden plunges.

3. The king-fisher's *plumage* examined—adaptation of bright hues and metallic lustre shown.

4. *Habits* of owl compared with those of king-fisher, to show the necessity of a different kind of covering. What would be the consequence had the king-fisher feathers like the owl?

III. The Duck.—Children called upon to say all they know of the *habits* and *food*, where seen, &c.

Refer to the habits and food of duck—to the chilling and softening effects of water—and then lead the children to see the necessity for such covering as

will resist these effects. Compare the different effects of rain on the feathers of a duck, and on those of a hen.

The reason of this difference may be illustrated by reference to the various ways in which oil is used where resistance to the influences of water is desired. Examine the plumage of a duck: use of thick downy under-coat—to prevent the escape of heat from the body; smooth, polished outer feathers—to keep out wet.

Habits of duck and king-fisher contrasted, to show the necessity of different modification of feathers.

IV. The Ostrich.—Refer to the country where it is found—its food and habits—show that flight is not necessary—refer to the heat of the country inhabited by the ostrich—the kind of protection needed; and lead the children to see how the plumage is fitted to afford this.

SKETCH FOR A LESSON ON THE BEAKS OF BIRDS.

FOR CHILDREN FROM EIGHT TO TEN YEARS OF AGE.

I. COMMENCE by questioning the children as to the organ by which birds obtain their food; how it differs from our mouth, and how it is a substitute for teeth; and draw from them all they may have observed as to the habits of birds, supplying information where necessary, and leading them to see that some birds, as the swallow, spend their time chiefly on the wing, darting with short and rapid flights in every direction; and some, as the duck, spend the greater part of their time in swimming; others, as the heron, are seen standing generally in the soft mud in the neighbourhood of pools and lakes; some, as the hen, may be seen constantly scratching up the ground; and others again, as the owl, stealthily flitting about at night.

Question as to how all these are employed, and *lead them to see that the difference of habits arises*

from the different kinds of food that they require, and the different elements in which they seek for it.

II. Present the beaks of the several birds above mentioned—Children examine them, and trace their adaptation to the wants of the bird.

1st. *That of the swallow*.—Thin—soft—very wide at the base, and coming quickly to a point—Why soft?—Inferred from the nature of its food, insects captured while on the wing—The necessity for the great width of the beak in proportion to the size of the bird, may also be inferred from the difficulty of securing these insects in the air.

2d. *The duck's*.—Broad, flat, and spoon-shaped, having a fringe at the edge of each mandible—Use of the fringe—Serves as a strainer. The reason of this shaped beak will be seen by reference to its food—small fish and insects—To the manner of obtaining them—dipping its head under water and straining the mud through the serrated edges of its beak, and retaining what is necessary.

3d. *The snipe's*.—Long and slender, serrated like the duck's. By reference to the food and habits, lead the children to see how this long and slender beak is fitted for entering the soft mud, and how admirably the serrated edge is suited for retaining the insects contained in the mud.

4th. *The hen's*.—Hard, strong, straight and blunt. By considering the habits of the hen, lead the children to see the necessity for hardness and strength, from the frequency with which it comes in contact with clay, stones, and other hard substances, also the hardness of the food;—the bird could not well pick up any grains without a hard instrument. Refer to the force with which it pecks, and show the necessity for bluntness—If sharp, would soon be worn away, and enter the ground by the force of the blow.

5th. *The owl's*.—Sharp, strong, and curved—The necessity for these qualities again inferred from the nature of its food,—birds and other small animals.

—it requires the sharpness and strength it possesses to destroy its prey and tear it asunder.

Before concluding the lesson, require the children to state how the beak of each bird mentioned is suited to its food, and then draw from them the conclusion, that the beaks of all birds are suited to their habits and wants, showing the goodness of God in thus providing them with what is best for them.

NATURAL HISTORY.

SKETCHES OF A LESSON ON THE MOLE.—TO BE GIVEN TO
CHILDREN OF TEN YEAR'S OF AGE.

No. I.—INTENDED SIMPLY FOR THE TEACHER'S OWN USE.

Suggested by a stuffed specimen in the Wurtemberg Department of the Crystal Palace, which represents the Mole as a grave-digger.

I. *Animal described*.—The *body* in form cylindrical—Compact, and strong in the fore part. The *snout* elongated, terminating in bone rather than gristle. The *eyes* small, and sunk in the fur—No external *ears*, but a simple opening concealed under the covering. The *skin* tough, and covered by an extremely close, fine, short *fur*—Having no determined direction, but, like the nap of velvet, presenting a smooth surface, incapable of being ruffled. The *limbs* short—The *front pair* thick, strong, and muscular, ending in broad *hands* spade-like in shape, obliquely inclined so as to make the inner edges the lowest part—The extremities of these organs, five fingers, scarcely distinct, but furnished with hard flat nails—The hind limbs small, and the feet comparatively feeble.

II. *Habits described*.—The mole subsists chiefly on worms, and the larvæ of insects found in the

greatest abundance under the surface of the earth, where the mole has its habitation beneath those miniature hills so frequently found in rich meadows, and cultivated fields. Its nest is of a conical form, carefully lined with vegetable fibre, and made a most comfortable nursery for its young, which are reared with extreme care and tenderness. Leading to the nest are always several subterraneous galleries, furnishing roads of egress and ingress.

III. *Adaptation of the organization of the animal to its habits.*—Structure, and habits of the mole carefully recapitulated.

From the peculiar construction of the front limbs, infer that they are essentially necessary in administering to the wants of the animal. Means the little creature has of excavating the passages in which its food is to be found. *Has* no other, and *needs* no other than those spade-like instruments the nails, the extremities of which loosen the soil, and render it capable of being collected in the hands; from whence it is thrown to the sides, and a little behind the animal. The nails, aided by the pointed long snout, admirably adapted for working its way in the earth, and detecting worms, grubs, &c.—directed to these by the acute senses of smelling, and hearing. Little power of vision required; little given. God makes nothing which has not some distinct end to answer. The goodness of the Creator manifest in withholding an external ear and a fully developed eye;—if given, sources not of pleasure but of pain, on account of their liability to injury from the mould in which the animal is constantly employed.

Covering exactly suited to an animal destined to lead a subterraneous life. Thick, short, and incapable of being displaced, it does not impede the animal in its progress—Does not retain the wet and mud. Well might the Psalmist exclaim, “O Lord, how manifold are Thy works, in *wisdom* hast Thou made them all.”

No. II.

THE METHOD OF GIVING THE LESSON ON THE MOLE IS HERE DETAILED AT LENGTH, TO SHOW NOT ONLY WHAT IS TAUGHT, BUT HOW IT IS TAUGHT.

I. *Structure described.*—A stuffed specimen of the mole being presented to the children, get them carefully to observe and describe its *principal organs*, directing their attention by means of questions, comparisons, &c.

Ask if they know any form which the *body* nearly resembles?—What things having the form of a cylinder are said to be?—What then may be said of the body of the mole?—"The body of the mole is cylindrical"—This should be simultaneously repeated and written by the teacher on the large slate.

Next let the children compare the *fur* of the mole with that of some animal in which the hairs are scattered and stiff—Call upon them to state the difference, and if unacquainted with the term that expresses the quality of the mole's covering, tell them that, "when things are made to lie closely together, and so as to occupy a smaller space than they otherwise would, they are said to be compact, or compactly arranged"—Let this be repeated more than once if necessary.

Inquire whether they know any manufactured article used in dress to which the covering of the mole bears a resemblance. The obvious qualities of the fur, such as short, thick, fine, will be quickly seen; but probably not one child will discover that, like the nap of velvet, it has no fixed direction, and is incapable of being ruffled, until told to stroke the animal from the head to the tail, and from the tail to the head, and a stuffed cat in the same way—Then to state what they observe—The children should describe the fur, and the teacher add to the *account on the slate*, "and covered by a fine, short,

compact fur, which has no particular direction, and cannot be ruffled."

Next ask, What animal has a *head* something like the mole?—When they had a lesson on the pig, what did they say of its *snout*?—How it terminated?—Let them feel the extremity of that organ in the mole, and then describe the head. "The head of the mole is small, tapering into an elongated snout, which ends in bone rather than gristle."—This should be repeated simultaneously, and written on the slate.

Other parts of the head named and described by the children—The *eyes* very small, and sunk in the fur. Should the children assert that the mole has no *ears*, tell them that it has no *external ears* that can be seen, but that it possesses the sense of hearing to a considerable degree. Question—With what do they hear?—Touch their ears—Do they think they would hear were that flap removed?—Not so well, certainly, but they would be far from deaf; for they have an *internal ear*, and the mole has this also; the entrance to which they may discover if they look carefully—Add to the notes on the slate, "The eyes are small, nearly hidden by the fur; there is no outer ear, but a simple opening, concealed under the covering."

Inquire if there is anything remarkable about the *limbs*?—They are very short—The *front pair* are strong and muscular, terminating in broad *hands*—Do the hands remind them of any tool used by gardeners, dustmen, &c.?—Yes, they are spade-like—When they compare the *fingers* of the mole with their own what difference do they observe?—What have they at the ends of their fingers?—What has the mole?—Desire them to describe the front limbs, and say what shall be written on the slate. "The front limbs of the mole are strong, muscular, and terminate in large, broad, spade-like hands, ending in five fingers, scarcely divided, and furnished with *hard flat nails*." By causing the children to compare

the position of the hands of the mole with that of their own, lead them to observe the oblique, downward, and outward direction of the former—Desire them to feel that portion of the body to which the limbs are attached, and contrast it with the foreparts of a rabbit, that they may perceive not only that the arms are strong, but that that part of the frame which supports them is so also—Question as to the difference observable between the front and hind limbs—The latter are small and slender, lying close to the body, the feet are furnished with claws, yet are feeble compared to the spade-like hands.

II. *Habits described.*—Inform the children that the mole cannot endure more than six hours' fast without great exhaustion—That it subsists on worms and the grubs of insects, found in the greatest abundance under the surface of the earth.

If the pupils are not acquainted with the interior of mole-hills, represent to them on the slate the galleries and miniature hills made by the excavations of the little miner—Speak of the lining of the nests of birds—Tell them that the nest of the mole is lined with vegetable fibre, and made a most comfortable nursery for its young, which are reared with extreme care and tenderness—That leading to the dormitory of the mole there are always several subterranean passages, dug out by the creature as means of going in and coming out—That he is an expert swimmer—Appears to enjoy the water; and requires to drink frequently; and that there is usually a colony of these little miners in possession of one common passage to the nearest stream or ditch.

III. *Adaptation of the organs to the habits, and locality shown.*—Let the children, with the assistance of the notes on the slate, and the occasional use of the ellipsis, recapitulate the description of the organization and habits of the mole—Ask them to what the first part of the lesson related, and to what the second—*Question them* as to what connexion there is

between the organs, and the habits and locality of animals—Require examples of animals having their organs exactly adapted to their mode of life—Question: What organ fits the monkey for its life amid trees?—What part of the bat is adapted for flight?—What enables the hedgehog to burrow in the earth?—What organ do they observe varies most to meet the wants of animals?—Draw from them the general rule, that “God, who formed animals, not only fixed the bounds of their habitation, and gave them their peculiar propensities, but also caused that the one should be fitted to the other.” This to be repeated. Question: Did they observe anything peculiar in the construction of the limbs of the mole?—What then do they expect to find?—That they are essentially necessary in administering to its wants—Where is its food found?—What means has it of getting at worms below the surface of the earth?—Have they ever seen men making sewers?—What implements had they?—The mole has similar work to do—What has it corresponding to a spade or shovel?—Desire the children to imitate with their own hands the position of the hands of the mole, and say if they were to throw anything from them, holding their hands in this position, in what direction with respect to their bodies it would go?—What would be the consequence if the mole could only use its feet in throwing soil *behind* it?—Are the feet of animals ever used in any other operation?—Think of the monkey, the cat, the parrot—But the mole does not convey its food to its mouth by means of its hands—What other organ could it use?—What does the hedgehog employ?—How is the snout fitted for this?—What senses in the mole would they expect to find very acute?—Does it need much light in its underground work?—What sense would not assist it in discovering its prey?—What have they observed when animals have not required a sense or organ?—Remark: They see that *God makes nothing that has not some distinct end to*

answer, some work to perform. Question: Do they see any reason why an external ear was not given to the mole?—If it had one, what must happen?—What must be the result of the dirt and dust entering into the ears and eyes?—Hence if bestowed they would be sources not of pleasure but of pain—What shall we say of the Creator of this little miner?—He is indeed *kind* as well as *wise*. “His tender mercies are over all His works.” Question: If they were to thrust a hand into some newly-dug earth, how would it feel?—What kind of covering then would be the best for one living under ground?—How is the fur of the mole adapted to keep in the heat of the body?—What other advantage arises from its fineness and thickness?—In what direction does a cat like to be stroked?—What would be done by pressing the hand the reverse way?—When told that sometimes moles pass each other in their very narrow galleries, or in their passage to a reservoir of water, and that not unfrequently a single mole can only just move with ease along a newly-excavated road, the children will readily see the suitability of a covering incapable of being ruffled, and of a body compact and cylindrical.—Ask if they can now account for the representation of the mole in the Crystal Palace as a grave-digger?—What do they observe in all its organs?—What said David respecting God’s works?—Let us also say, “Lord, how manifold are thy works; in wisdom hast Thou made them all.”

The lesson to be recapitulated, and condensed into a simple summary containing the principal ideas—To be written at home from memory, and brought the following morning.

LESSONS ON INDIAN-RUBBER.

LESSON I.

FOR CHILDREN OF SEVEN OR EIGHT YEARS OF AGE.

I. *Qualities*.—Lead the children to observe and name some of the most obvious and distinguishing qualities—It is *black*, *opaque*, and *smooth*—By experiment, give them an idea of its elasticity and inflammability—Make them observe the size of the piece; call a child to stretch it, then let it go; the rest to observe, and say what has taken place, viz. that the indian-rubber has gone back to its place, or resumed its former shape—The name given for this quality, *elastic*, and examples of other objects possessing the same quality required—The difference between the elasticity of whalebone, sponge, and indian-rubber shown—Whalebone, when bent, and let go, goes back to its former place—Sponge resumes its former size when no longer compressed.

To develop the idea of inflammable, lead them to observe that it burns with a flame by applying it to a candle—Give the name for this quality, *inflammable*, and require examples—Show them the difference between animal and vegetable substances, with respect to the manner in which they burn, and let them give a list of each—1. Animal: sponge, leather, wool, feathers. 2. Vegetable: wood, cotton, &c.—Lead them to observe, that while vegetable substances burn with a flame, the animal substances only frizzle, emitting a disagreeable odour.

II. *Natural history*.—The juice of a tree—Its colour—How obtained—Process of drying—Shape of the moulds—Evaporation.

III. *Uses, and qualities which fit it for these uses*.—Used for shoes—Why?—Balls, tubes, &c.; and for effacing, blacklead marks, from which it receives its name—The natives of the countries from which it is obtained use it for torches—Why?—What quality fits it for this use.

LESSON II.

FOR CHILDREN FROM EIGHT TO TEN YEARS OLD.

I. *Properties*.—Children to discover that it is soft—flexible—highly elastic—tough—difficult to be cut.

Teacher shows the effect which heat has upon it, by placing a piece on a hot iron plate—Elasticity increased. Also, the effect which cold has upon Indian-rubber, by plunging the same piece into cold water, elasticity lost; afterwards, by subjecting it to heat, elasticity regained.

Teacher places one piece in hot, and another in cold water, or, in spirits or acids; a third, in ether, spirits of turpentine, or coal-naphtha with heat applied. Children to observe the different effects produced;—in the ether, spirits of turpentine or naphtha, it is *soluble*; in water, spirits, or acids, *insoluble*.

That it is highly inflammable, to be discovered by experiment.

II.—*Natural History*.—This to be told by the teacher in such a manner as to keep the minds of the children inquiring and active.—It is the juice of trees growing in the warmer parts of South America and the East Indies—The countries to be pointed out on the map—Obtained by incisions made in the bark—The colour and consistency of the juice—The manner of drying—The changes produced by drying—The shape of the moulds on which it is dried.

III. *Preparation for use*.—This also to be told by the teacher.—Placed in an iron cylinder lined with spikes, through which passes an iron shaft also armed with spikes; this made to turn round rapidly—The effect of this operation; the heated mass thus formed firmly pressed together in moulds of the required shape forming a solid mass; from this, thin sheets or threads cut as required.

IV. *Uses*.—1. One of the most common,—that of effacing black-lead-pencil marks from paper.

2. Another extensive use,—that of making Mackintosh clothing; but for this, some further processes necessary: First, to be dissolved in naphtha or turpentine, spread upon two pieces of cloth, and these pressed together by rollers. Question as to the effect upon the cloth; and get the children to state the qualities of Indian-rubber, that make it suitable for such a purpose. What necessary to be done when greater strength required?—Three pieces of cloth used, cemented by two layers of Indian-rubber—Quality on which this use depends. Show the change produced in Indian-rubber when combined with a small portion of sulphur:—does not, as formerly, become hard, or lose its elasticity, by exposure to alternations of temperature; and thus made more useful.

3. Frequently used for making torches, in Gujana, where the trees producing it abound—Quality on which this use depends.

4. Also extensively used in making tubes, water-beds, and air-tight vessels for various purposes—Qualities on which its utility for such articles depends shown to the children, *i. e.* impervious to water and air, and when freshly cut, clean surfaces of Indian-rubber readily adhere if pressed together, or may be united by that which has been dissolved in naphtha.

It may often be seen applied to other uses:—for instance, to the construction of pontoons, boats, shoes, maps, and a variety of other articles.

V. *Summary*.—To be made either orally, with the use of the ellipse; or, (better with a class of this age,) reproduced entirely by the children on their own slates.

SKETCH OF LESSONS ON FUR.

TO BE GIVEN TO CHILDREN SEVEN OR EIGHT YEARS OLD.

LESSON I.

I. *What it is, and how fitted for the clothing of animals.*—Pictures or stuffed specimens such as can be procured brought before the children, that they may be led to determine what fur is, and observe its great variety and beauty, owing to the difference in the colour, length, and thickness of the hairs—Use to the animal—State to the children the changes which it undergoes at different seasons of the year; in winter becoming *thick, close, and abundant*, and in some the colour changing to white; in summer partly shed, and much more loose and open—The reason for these changes—The modifications observable in the fur of animals inhabiting different climates—The adaptation to the requirements of the animals, manifesting the wisdom and goodness of God.

II. *Qualities.*—Soft—Formed of hairs, therefore said to be hairy—The idea of flexible developed by referring to a boa, which can be put round the neck as often as may be required, or bent in which way we please—Name given and repeated—In order to ascertain whether the children connect the idea with the name given, require them to give examples of other objects possessing the same quality—The difference between the skin and the fur—The one soft and flexible; the other stiff and somewhat harsh—In what way it is fitted for the wants of the animals of which it forms the covering—Why we say it is warm—Lead them to observe that it is neither hot nor cold to the touch, but that as it does not allow the warmth of the body to pass away, we say it is *warm*, and so of other objects.

III. *Uses to man.*—Made into muffs, boas, cloaks, mats, &c.—The qualities which fit it for such uses—*warmth, softness, and flexibility.*

LESSON II.

I. *Fur-producing countries.*—These pointed out on the map—as, Hudson's Bay Company's territory; Russian America; Siberia, the most important—The wild, dreary, and desolate character of these countries—The animals inhabiting them alone rendering them of any commercial importance—Refer especially to the Hudson's Bay Company's territory; the extent and character of their possessions; the time and manner of establishment; the factories and their situations. (All this described to the children.)

II. *Hunting season and hunters.*—Hunting season—Why at a particular time—Question here as to the changes necessary in clothing on the approach of winter; and lead the children to see, that as this is the season when animals require most warmth, so it is the season when fur is the thickest; hence the time when it is most valuable, and hence also the hunting season—Speak of hunters, and the preparation for hunting—Qualities of a good hunter—cautious in disturbing, dexterous, and fertile in invention, bold and courageous in attacking and securing—Why are these qualities essential to a good hunter?

III. *Contrast Furs of arctic and tropical regions.*—Contrast the fur of animals found in northern latitudes with those met with in the tropics and warmer regions—In the first it is rich, fine, close, silky, and warm; in the second, although beautiful in appearance, yet thin and scattered, neither adapted for warmth, comfort, nor general use—Contrast northern and tropical climates, to lead the children to see the necessity for this difference of covering—Show that the difference in fur of northern and tropical climates, arises from the same cause as that which marks a difference in the fur of the same animals at different seasons—A beautiful evidence of design in the seal—Inhabiting the arctic regions, great warmth necessary—Under the skin of the common seal a thick

layer of fat; in the fur seal no such layer found, but the animal is covered with a rich curly silky down, among which is scattered long coarse hair—The uses to which this fur is applied—The preparation it undergoes, and beauty of its appearance.

IV. *Uses to man, and qualities which render it useful.*
—Enumeration of uses to which fur is applied, and the children led to observe the qualities which render it so extensively useful. (The children are already supposed to have been made acquainted with fur, in their lessons on objects.)

IV. *Processes which Fur undergoes to fit it for use.*

1. The state in which the skins are received by the furrier.

2. Cleansing—Use of saw-dust—Effect—State of skin—Difference between the skin of arctic and tropical animals—Manner in which it is softened and made thinner—Preparation for making it up into the articles required—Laid in the saw-dust—Why?—Effect—Advantages taken of the pliability of the skin in this state.

3. Dyeing—How the appearance of the darker furs is obtained in this operation—Difference between the dyeing of the fur seal and beaver, and that of other animals—The simplicity of the first operation—Tedium of the second, and skill necessary for the performance.

SKETCH OF A LESSON ON THE TWO STATUES OF THE CHILD, DOG, AND SERPENT.

TO BE GIVEN TO A GALLERY OF INFANTS.

If the children have not visited the Exhibition, obtain for them the best picture of the statue, or describe it to them. But in order to start with what the children know, and as an introduction—

I. DRAW from them any information they may have received in former lesson, as to the dog, and its parts—Pointed head—Hanging ears—Neck—Hairy

body—Four legs with paws—Tail, &c. &c.; also some of its uses to man, as taking care of sheep—Watching houses—Guarding labourers' clothes—Leading the blind—Drawing small carts—Hunting hares, deer—Swimming into the water to save persons who are drowning, &c. Let them also tell what they know of the serpent—It crawls along the ground—Has a long winding body—Is without legs—Tell them how it fastens upon people, and that when it bites it sends into the wound a poison which causes death.

II. *Examination of the Statue or Picture.*—If there should be no picture for the children to examine, the teacher must describe the statue; or, better still, draw it before them, and require them to describe it themselves, thus;—In this group there is a fine large dog, a little child, and a serpent—The dog is standing up looking towards the serpent, very fiercely, with its mouth open—The serpent is lying on the ground fixing its eye on the child—His tail is twisted round the leg of the dog, and his head raised looking towards the child—The child is under the dog holding tightly one of the legs—His mouth is open—He appears to be crying and he looks very much frightened. Draw from the children why the dog looks so fierce—Why the child so much frightened—What the serpent is about to do. The dog is prepared to attack the serpent—The child wishes to flee from it and obtain protection—How is this? Is the dog intending to defend himself? No, but to protect the child—What! the dog protect the child—Yes, dogs often do this. Ask if they can give any instances of it. To return to the dog we have been talking about, and see how he gets on with the serpent—He seized the serpent, just as it was about to give the poor little child a deadly wound—And killed it. Noble dog! he ran the risk of his own life to save the child. The poor child was relieved from his dreadful fear, and in its place, felt love and gratitude to his brave deliverer.

Now show the children the second picture or drawing, and make them point out the various objects in the group, and their attitudes; or if there is no picture or drawing, describe the statue thus—The dog, child, serpent, all here; but as before?—No, in very different positions—The dog now has his mouth shut, and appears with his usual mildness—Looks pleased—How is this? You can tell—Yes, he killed the serpent and rescued the child—Where is the serpent? lying stretched on the ground, his head in one place and his body in another—The child is not now under the dog—Afraid—Trembling—Seizing hold of his leg; but on his back, kissing and caressing his deliverer.

III. *Practical Lesson in Humanity.*—How the children feel towards this dog—How we should feel towards all dogs—And how behave to them. Is it any wonder that dogs are so often the favourites of every one and made a companion of man? What cruelty towards animals shows. A love of giving pain to others because we have power over them. Have any indulged in so bad a disposition? The opposite disposition shown by reference to the dog—Desire to help any one in distress—The pleasure of doing good.

Remark.—When an appropriate piece of poetry can either be repeated or sung at the end of such a lesson as this, it helps much to increase the impression made. There are several on this subject.

SKETCHES OF A SERIES OF GRADUATED LESSONS ON
THE PIG.

TO BE GIVEN AT DIFFERENT STAGES OF THE CHILDREN'S ADVANCEMENT.

SKETCH I.—FIRST STEP.

I. GET the children to observe the pig—To name and point to all its parts, as the head, eyes, ears, nose, mouth, neck, body, legs, tail, &c.—Tell them that the nose and mouth together are called the snout—Ask whether they have seen a pig—If like the one before them—The difference—What they have seen pigs doing—Their colour, shape, &c.—Where pigs live—If they have ever seen a sty—What they eat out of, &c. &c.—Thus leading them to talk familiarly and to say all they can about pigs.

II. Speak of the use of the pig to man—What its flesh is called—If they have ever tasted it.

III. Who made the pig—How we should feel towards God who has given us this useful animal—How it should be treated; giving some examples which have come under their notice of cruelty to the pig; appealing to the children if this conduct is right, or pleasing to God—How God would regard such children—How all animals which God has made should be treated, and if they would like to be treated cruelly themselves.—By these and similar questions exciting humane feelings towards animals.

SKETCH II.—SECOND STEP.

I. Let the children look at the pig and examine its parts, asking for the name of any part they do not know—The teacher will then call out the parts whilst the children point to them; and next the teacher will point whilst the children give the names—First learning to connect the thing with the name, then to apply the name themselves to the thing—Get them to tell

the number of each part, as two eyes, two ears, four legs, &c. &c.—Also their position with respect to each other, as the legs under the body, the body resting on the legs, the neck at one end of the body, the head on the neck, &c. &c.—The use of each part, as the eyes for seeing, the ears for hearing, the legs to walk with, &c. &c.—Any peculiarity about each, as their small half-closed eyes, short thin legs, small twisted tail, &c. &c.

II. Get the children to speak of the general appearance of the animal—Clumsy—Dirty—Dingy—Dull look—Its colour—Size, compared with that of other animals, as the horse, cow, ass—After getting from them what they have observed respecting its size, place before them a picture of the relative sizes of animals.

III. The uses of the pig spoken of—Its disposition, as harmless, timid, squeaking and running away from danger rather than trying to encounter it—Leading them from this to see the foolishness of being afraid of the pig, and also the cruelty of teasing it and treating it unkindly—Here an anecdote may be related, either referring to its use to man, or the cruel usage it sometimes receives; thus encouraging right feelings towards this animal.

SKETCH III.—THIRD STEP.

I. Get the children to name the actions peculiar to the pig, and the limbs with which it performs them, as rooting and grubbing with its nose, into which is sometimes put a ring to prevent its doing injury to gardens, hedges, &c.—Tearing and scrubbing with its feet—Beating off the flies with its tail—Wallowing in the mud for the same purpose, &c. &c.—Also the noises it makes, as squeaking, grunting, &c.

II. The use of the pig when alive—For clearing away food which has become useless to man, and which, being thrown away into the open air, would become

offensive, were it not removed as it is by the pig, which is not at all particular as to what it eats: for this same reason many poor persons in the country can keep a pig, when they could not keep any other animal—Its use when dead—Its flesh for food—Get them to name the different kinds of pig flesh, as ham, bacon, pork, &c.

III. Speak of how we should treat the pig—First as an animal of God's making, and then as one useful to man—Also lead them to see that, although it is dirty and disagreeable in its habits, and disliked by most people, yet we should not treat it cruelly or put it to torture.

IV. At the end of the lesson the children may be required to recapitulate it from memory.

SKETCH IV.—FOURTH STEP.

I. Get the children to name the parts of the pig, and give a description of each—As its head, small and tapering—Its ears, large and flat, hanging down on each side of its head like two flaps—Its eyes, small, round, and sleepy-looking—The snout, which connects the nostrils and the mouth, is large and armed with strong teeth, and terminates in a hard gristly substance—The neck, short and thick—The body, cylindrical, and covered with long coarse hairs called bristles—The legs, short and thin—The feet, cloven—The skin, coarse and thick.

II. The habits of the pig spoken of, as that it eats all kinds of vegetable and animal substances even in a putrid state; also bran and meal, and indeed anything that comes in its way—Its habits dirty and disgusting—It is fond of rolling itself about in the mud—Why?—To get rid of the vermin with which it is infested—and spends all its time in eating and sleeping—It never attacks other animals but in self-defence—It seems to know when a storm is approaching, for it runs towards its sty screaming violently, and

gathers all the straw into a heap to hide itself—The pig is subject to diseases from its gluttonous habits—It lives for 18 or 20 years, and is found in almost every country of the world. *

III. Question the children as to the adaptation of its parts to its habits, &c., by comparing the one with the other, the children making the conclusions—The large ears, which flap about on a hot day and prevent the flies from getting into them and teasing the animal—Does not require very strong sight—Its small eyes are sufficient for the circumstances in which God has placed it—Also the long flexible snout terminating in a ring of gristle, fitting it for grubbing in the mud for its food and rooting up vegetables; were it furnished instead of this with a soft fleshy mouth, the animal would not be able to do this without pain and inconvenience—The large strong teeth which help it in mastication—It is covered with stiff bristles; were it covered with hair or fur, it could not roll about in the mud without collecting much dirt on its body—Also that its hard thick skin makes it almost insensible to the blows it so often receives—Ask who made the pig, and lead the children to see and admire the wisdom and goodness of God, in making all its parts so beautifully adapted to their various uses.

As the children are describing the parts, write the name and description of each on the slate, that they may be aided when they consider the adaptation of the parts to the wants of the animal. The children should state this afterwards on their slates.

SKETCH OF A LESSON ON PEAT.

The following lesson is drawn up for children above ten years of age, supposed to be acquainted with the nature of evaporation, condensation, and the general principle of chemical affinity.

The plan of giving the lesson is, first, to examine the substance, on each point to gain from the children all they know or can observe, and when any information is given, to draw from them any conclusion at which they can arrive, or any application they can make.

I. REFER to the formation of soils generally, as sand, clay, chalk, and gravel, and show that they are all the decomposed remains of rocks lying under them, as in the case of the chalk soils of England; of mountains near them, or it may be at a great distance from them, as in the case of all soils formed by the deposits of rivers; then examine a piece of peat, to ascertain its fibrous character and inflammable nature, from whence the children may draw the inference, that it is not like the other soils, of mineral, but is of vegetable origin.

II. *Consider the conditions under which it is formed.*—It occurs in places from which water cannot escape by drainage, and is not evaporated. Lead the children to see how a fallen forest, or even a few trees, may become the nucleus of a bog; and also that it spreads on all sides, and increases in depth, by describing the growth and decay of successive crops of vegetation.

III. *Locality, extent, depth, &c.*—Some part of most countries covered with peat—Parts of England and Scotland in which it occurs—3,000,000 of acres, or nearly one-seventh of the surface of Ireland all bog—Average depth of bogs in Ireland—Speak of difference of colour and density at different depths, and lead the children to see why it is heavier and blacker towards the bottom than at the top.

The trunks of oaks, firs, yews, and other trees, are found in the larger peat-bogs—Black appearance—How produced—Refer to the process of tanning, and

the effects of tanning on animal and vegetable substances, to show how the trees have been preserved.

IV. *Uses of peat.*—1. The most general use, for *fuel*—Describe the process of turf-cutting—When cut with a spade—When moulded with the hand—Produce of an acre of bog nine feet in depth, 11,000 tons of peat.

2. *Peat-charcoal.*—How manufactured—Where used for smelting and refining iron (Bavaria and Bohemia)—Why preferred to other fuel—Refer here to the effects of sulphur upon iron, and show that the superiority of peat-charcoal over coal or coke arises from its being free from that substance. (Four tons of dried peat will make about one ton of charcoal.)

3. *Use of peat-charcoal as a fertilizer of the soil.*—Refer to the food of plants, and show how it is supplied by peat; (absorbs eighty per cent. of water, and retains it till the soil around it becomes drier than itself, when it begins to give it out—Absorbs ammonia and other gaseous substances, generated during the putrefaction of animal and vegetable matter, and retains them in the soil for the use of the plant—Supplies carbon, of which the greater part of all plants is composed)—Peat-charcoal may be used as a deodorizer—If fresh powdered charcoal be mixed with the most offensive mass of animal or vegetable matter, it becomes perfectly deodorized in a few moments.*

V. *Substances obtained from peat.*—New method of making peat-charcoal, (peat burned in a tall brick furnace, the chimney of which passes into a condenser, where the vapours are cooled and retained)—On examination, the condenser found to contain,

1. Great quantity of inflammable gas, superior to coal-gas—Why?—Burns more brightly.

2. Tarry substances of a peculiar nature.

* It is now used for this purpose, with great success, in some of our hospitals.

3. A liquor highly impregnated with ammonia.—Speak of various substances obtained by analysis of tarry substances and ammoniacal liquor—their uses and value.

VI. Give some account of the Irish Amelioration Society—Their proposed plan of making peat-charcoal, and obtaining all the chemical products of peat—Great importance to Ireland if successful—Peat would then be more valuable than Australian gold—Why?

Contrast the uses of living and dead vegetation, and lead the children to see how wonderfully, yet how simply, God provides for the wants of His creatures.

LESSON ON WOOD.

FOR CHILDREN ABOVE TEN YEARS OF AGE.

Intended for those who have already had some lessons on plants, and are acquainted with the nature of their food, and the conditions necessary to their growth. The teacher's questions should direct the observation of the children to whatever is presented throughout the lesson, and the information gained should be, as far as possible, their own conclusions from what they have observed.

I. *Arrangement of parts, &c.*—A transverse section of a stem should be presented, and the attention of the pupils directed to observe,

1. The pith in the centre, surrounded by the wood, growing in concentric circles; and the bark outside the whole—A section of yew, oak, acacia or ebony, would show a marked difference in the colour of the interior and exterior wood, for a reason to be explained afterwards.

II. *Manner of growth.*—1. *The pith.*—Extent of this substance in different trees, and at different periods of growth—Pith of elder examined by children—Colour and use of pith in young shoots—

State in old trees, not necessary to the life of plants after the first few years—Why? Medullary sheath, how formed?—Position—Use.

2. *The wood*.—Describe the formation of first circle, and its position, with reference to pith—Speak of the different tissues of which woody fibre is formed—Direct observation to the arrangement of circles—State the time occupied in the formation of each—How the age of a tree may be ascertained from them. Lead the children to see why the circles of wood do not appear in indigenous plants of the tropics, by contrasting the seasons of growth in warm and cold climates.

(This characteristic of tropical plants is well shown in some of the woods in the Great Exhibition.)

Nature and situation of medullary rays—Appearance in transverse section of wood—In longitudinal section of oak forms what carpenters call silver grain—Difference between silver grain and grain resulting from arrangement of woody fibres.

3. *The bark*.—Describe the manner of growth, time in which each circle is formed, position of each new circle with reference to the old bark and new wood; and lead the children to see the cause of the rough exterior of trees, and why bark splits in all directions and falls off.

III. *Heart and sap-wood*.—Compare inner and outer wood—Inner different in colour, density, and strength, called heart-wood—Cause of these differences—Uses of heart-wood, consequent upon them—Relative value of heart and sap-wood to man—Relative importance to tree. (This latter may be shown by reference to old hollow trees when heart-wood is absent.)

IV. *Some peculiarities of growth*.—Circles of wood never equal on all sides of a plant—Refer to the effects of sunlight on the growth of plants, in order to show why the circles are thickest on the south and the east; also why trees on the borders of woods or other situations, where one part is shaded, have the

thickest circles on their exposed sides—Difference between the limbs of trees growing within the shelter of a forest, and the same kind of trees in exposed situations—Refer to cause.

In order to be properly worked out, the matter here given should occupy two lessons. The children should be required to reproduce what they have received; either by answering in writing questions put by the teacher, or by writing all they can remember under each head.

SECOND LESSON ON WOOD.

COMPARISON OF WOODS OF DIFFERENT CLIMATES.

Several specimens, showing the growth, peculiar grain, &c., to be presented to the children for examination.

I. COMPARE transverse sections, and refer to the difference in the length of the seasons in different countries, in order that the children may be led to discover under what circumstances the circles of wood are formed—Why they are so highly developed in woods of northern climates, and why they do not appear at all in the woods of the tropics—In the former the process of growth is over in a short time, in the latter it continues through the year.

II. Comparison as to density, hardness, toughness, closeness and beauty of grain in different woods, and general uses inferred from the relative degree in which these qualities are possessed.—Refer to the period when oak was chiefly used for house building—Compare dwellings of the poor in the fourteenth century and at the present day—Contrast oak and fir, to show why the former could not be used by the poor for house-building purposes, and why the latter is universally preferred at the present day; and so lead the children to see how much the introduction of the northern woods, by their cheapness, lightness, and the ease with which they are worked, has contributed to the better construction of dwellings for the poor.

The contrast may be further shown by comparing the three-legged stool, the block of wood, the straw-bottomed chair, and table of rude planks raised on tressels, with the convenient and often tasteful furniture found in dwellings of the poor at the present day.

Compare furniture of the rich at the same period with their present furniture, to show how the carved oak, the elm, and beech of former days have given place to the elegant and highly-polished furniture, made from the beautifully-marked and tinted woods of the tropics—Refer to the hardness and scarcity of these woods, and let the children thence infer why they are beyond the reach of the poor—Plans used by modern makers of furniture, to economise the quantity of wood used, especially that of veneering, and inference as to state of society.

Compare woods of the temperate regions with those of the south and north, and let the children infer thence why oak, elm, beech, &c. are used where durability, resistance to great pressure or violent action is required—Relative qualities of fir and oak for purposes of ship building—Why fir is preferable for masts, oak for hulls—Relative importance of woods of different regions to mankind—Which indispensable—Which ornamental and indicative of wealth—Example: Austrian and other furniture in the Exhibition.

The following questions are appended, in order to show what the children would be required to write after having received the above lesson.

1. Account for the difference in the development of the circles in the woods of northern, temperate, and tropical regions.

2. In what respects has the introduction of northern woods contributed to the comforts of the poor, and why are they generally preferred for house building?

3. Account for the changes that have taken place in the furniture of the rich as respects material and style, and describe the process of veneering.

4. For what purposes are the woods of temperate regions preferred to those of the south and north; and why?

THE INDIAN ELEPHANT.

SEEN IN THE INDIAN DEPARTMENT.

TO BE GIVEN TO A CLASS OF CHILDREN OR STUDENTS.

I. THE class should be led to describe the Indian Elephant, as seen in the Exhibition—Its size, colour, large body, pillar-like legs—Its trunk, as to its length, texture, termination, canals, flexibility—The ears, their size, shape—The tusks, their great size, weight—The material of which formed—Next notice the head, as to its form, as distinguishing it from the African species; its great weight independent of the tusks; the short clumsy-looking neck—The feet, toes, and the general appearance of the body—A tooth should be produced and examined, or a picture shown; the different materials of which it is formed should be observed, and the children led to see the wise arrangement of one substance wearing away sooner than the other. The class should compare the tooth of the Indian Elephant with that of the African, and describe the different arrangement of the ridges.

II. *Habits—Propensities.*—Under this head the class should name the food upon which the Elephant subsists, as well as the mode in which this food is obtained; and should be led to see that it cannot be procured in the same way as that of other animals, either by browsing or grazing, because of the shortness of the neck—The quantity of food necessary for the support of such an immense animal should be noticed—The country in which we might expect to find such animals—The use of the proboscis should here be dwelt upon, as to the mode of using it either to break off the branches of trees, or to gather the herbage—The tusks, their use in procuring or helping

to procure food—The class should be told of the use made of the Indian Elephant in war, for conveying cannons over bad roads; for removing luggage; in hunting, &c.; and should be led to show how the qualities in the animal enable man to make such use of it.

III. The class must now be led to see how beautifully every part of the structure is adapted to the wants and habits of the animal—To trace design in the formation of the creature—And should dwell on the goodness of their Creator in giving the lower animals structures that will enable them to live happily, and follow that course to which their habits implanted by the same hand would lead—In order to accomplish this, the children should be led to notice the adaptation of every part to its particular office, but particularly of the following:—The body, large, massive, heavy, could not be supported by tender weak legs, such as those of the deer or giraffe, therefore such legs are not given, but pillar-like columns, which have quite sufficient strength for the purpose required; also, the animal being herbivorous and not carnivorous, it does not require legs for fleetness—The head, very ponderous, but rendered more so by the tusks, requires a neck of great strength to enable the possessor to keep it from the ground—Such a neck is given to the elephant, containing the same number of bones as we find in the giraffe and other animals, but having these bones so compressed as to give much strength and firmness—But this very shortness of the neck prevents the animal from obtaining food in the ordinary manner of herbivorous animals—What then could be given to compensate, or what so admirably meets its wants, as the long flexible trunk?—With this organ the branches are pulled from the trees, and the smallest leaf may be raised from the ground, so that every purpose is effected which is required either for the defence of the creature, or for obtaining the necessary sustenance.

SKETCHES OF TWO LESSONS ON THE GREAT AMERICAN EAGLE.

LESSON I.—FOR CHILDREN FROM EIGHT TO TEN YEARS OLD.

I. *Organs examined and described.*—The children, after a careful examination of a stuffed specimen of the American Eagle, and also of a skeleton of it, (if one can be procured,) called upon to describe the various organs of the bird, particularly those which characterize it as a bird of prey; as, the bill—elongated, strong, straight at the base, curving in a regular arc, and forming a hook; toes—arranged three before and one behind, covered with scales, furnished with sharp and strong talons; the eye—dark and piercing; the wings—strong, expansive, and slightly rounded, frequently measuring 15 feet from tip to tip; plumage—close and compact; colour, when full grown, deep chocolate, approaching black; in this species of Eagle, the head, neck, and tail are white.

II. *Locality, habits, and food.*—*Locality.*—Spread throughout nearly the whole of North America—Does not frequent bold, rocky scenery—Prefers low lands—Abounds in the vicinity of the Falls of Niagara, and that of the larger rivers—Also along the coast of the great inland lakes of that country—Builds its nest in the top of a tall tree—Composes it of sticks, weeds, and moss—It often measures five or six feet in diameter—Does not build a fresh nest every year—Annually augments the old one—Hence, in course of time, it becomes very deep.

Habits.—A solitary bird—Never more than a single pair inhabit the same spot—Reason—Eats such an amazing quantity that more than a single pair would not find sufficient food in the same place—Even the young ones driven from the nest as soon as they are able to fly—Although a bird of prey, extremely fond

of its young—Supplies them plentifully with food—Often encounters great danger in their behalf—By means of its wings aids the young ones in their imperfect attempts to fly.

Food.—The American, or White-headed Eagle, feeds voraciously upon fish, large birds, young lambs, squirrels, and other animals—Frequents the Falls of Niagara, not only for the purpose of obtaining fish, but also for seizing the numerous carcasses of squirrels, deer, bears, and other unfortunate animals, who, in attempting to cross the Falls, have been precipitated into the rapids below.

III. *Summary.*—The lesson to be reproduced by the children in writing upon their slates, either from the notes written upon the large slate by the teacher whilst giving the lesson, or by answering the following questions. What peculiarity in the organs of the Eagle shows it to be a bird of prey?—Where is the White-headed Eagle found?—What kind of nest does it make?—What are the habits peculiar to the bird?—On what does it feed? &c. &c.

LESSON II.

I. *Adaptation of parts to habits.*—The children having now a clear idea of the organization, habits, food, and locality of the bird, will be able, directed by questions, to work out this head of the lesson.

The strong, sharp, hooked bill enables the Eagle firmly to grasp and easily to divide its prey—The arrangement of the toes, to grasp firmly—The strong and nearly pointed wing—the boat-shaped body—the closeness of its plumage (which offers no resistance to the air)—and the lightness of the skeleton—all conspire to give the bird extraordinary powers of flight—The eye, too, possesses a third eyelid, which, although supposed to exist in all birds, is more clearly defined in the Eagle; hence he can gaze on the noon-day sun without blinking—By the great muscular power which the Eagle possesses he is

enabled to seize and capture animals much larger than himself; hence, *justly*, called the "King of Birds"—Able to exist in every climate; hence, when food fails in one locality, he removes to another—Aided in doing this by his extraordinary powers of *sustained* flight.

II. *An encounter between a fish-hawk and an eagle pictured out to the children, by way of further illustrating the habits of the eagle, and the manner in which he obtains his prey.*—The eagle, elevated on the high dead limb of a very tall tree, which commands a wide view of the neighbouring shore and ocean, appears to be calmly watching the movements of the white sea-gull, the noisy crow, and all the winged multitudes who are flitting below, each seeking his prey from the same inexhaustible store, the ocean. Are these the objects of the eagle's fixed attention? No; for look! what is that which hovers about, high above all the others; so high, that although a large bird, it appears a mere speck in the sky? By his wide-spreading wings and the manner of his flight, the eagle knows him to be the fish-hawk, hovering over the water in search of prey, and his piercing eye brightens at the sight. He balances himself with half-spread wings on the branch, awaiting the result. Presently, down darts the fish-hawk into the sea, with the rapidity of an arrow from the bow, to seize some poor fish which he has selected as his victim; he is covered with the billows, and the white foam dashes around him on every side. Where is the eagle now? Still watching with the greatest eagerness. He bends his head ready for flight, and presently sees the fish-hawk appearing above the waves, struggling with his prey, and mounting into the air with screams of exultation. Now is the time for the eagle; at this signal, he darts into the air, chases the fish-hawk, and soon gains upon him. Each tries his utmost to mount above the other, displaying in the attempt the most astonishing powers of flight. The

eagle gains upon his enemy. Why? He has no burden. He is just on the point of reaching him, when the fish-hawk, with a sudden scream, drops his fish; and now watch the movements of the eagle; he balances himself for a moment, as if to take a more certain aim; then descends like a whirlwind, snatches the falling fish, ere it reaches the water, and then silently bears his booty away to the woods.

Here the children will naturally wonder how the eagle can possibly overtake the falling fish, (since if two objects are thrown from an elevation at different times, that which is first thrown will first reach the ground;) but, owing to the immense rapidity with which the eagle can fly, and the great muscular effort which he puts forth on this occasion, he is enabled to descend more rapidly than even the falling fish, and thus to seize it ere it drops into the water.

III. *Summary*.—The matter of the lesson to be reproduced by the children, in the same manner as in the preceding one, viz. in writing upon their slates, either in answer to questions put by the teacher, or with the assistance of the notes written upon the large slate during the lesson.

THREE SKETCHES OF LESSONS ON BEES.

LESSON I.—FOR INFANTS.

I. *Examination of the Bee*.—A bee should be shown to the children, and having determined what it is, they should be encouraged to name and describe its parts, and by questioning be led to tell their number, position, and use; as—It has four thin, transparent wings, two large ones and two small ones, two on each side of the body—They enable the bee to fly—They are spread open when the bee is flying. When the wings have been described thus, the

children should repeat simultaneously with the use of the ellipsis. Another part should then be named by the children; perhaps, the legs—Their number told—Six—How placed—Under the body. By being asked what bees have generally been doing when they have seen them, the children will see that the bee does not use its legs much for walking, but chiefly for standing upon; the joints should then be discovered by examining the legs very closely, after which the children should be told that on each of the hind legs there is a small opening, used for containing bee-bread, the food of the young bees, which the bee obtains from flowers at the same time that it is gathering honey—these openings are called “baskets,” the reason of which will be readily found out by the children. The children should now repeat, with the aid of the ellipsis, all that had been said about the legs of the bee. The *body* might next be described as being rather small, divided into three parts, and situated between the wings. Having observed this, it also should be repeated as the former part. The *head* would perhaps be next mentioned, and by questioning, the children led to name its parts, and their number; as—Two eyes with which it sees—Two feelers—A mouth between the feelers. The tongue should be drawn out, and shown them, that they might see, by its great length, how beautifully it is adapted to procure the honey from the bottom of flowers, and then to curl up, that it may be out of the way.

II. *Habits of the Bee.*—The children should then be questioned as to where they have seen bees—Flying about in fields and gardens—On flowers—Going in and coming out of their hives, &c.—In what kind of weather they come out—In sunshiny weather—How employed—Gathering honey—Where they took the honey after it was obtained, and what they did with it—Carried it to the hive, and stored it up for winter's food. Their attention should now

be directed to the great industry of bees, and the happiness they appear to enjoy.

III. *Lessons of instruction.*—The children should now, by questions, be led to draw two lessons for themselves, from what had been said about the bee. 1st. If we wish to be happy, we must be busy and industrious like the bee. 2dly. We should never tease or injure what God has so beautifully made, and which He formed to be happy.

(If the children are not too tired, they should repeat or sing the piece, commencing, "How doth the little busy bee.")

LESSON II.—FOR CHILDREN FROM TEN TO TWELVE YEARS OLD.

DESCRIPTION OF A BEE.

I. *Examination of the Bee.*—The children should be directed to examine a bee very minutely, and the following description, as far as it can, should be drawn from them; and what they cannot observe, they should be told.

The bee possesses a horny covering, which is harder than the internal parts, thus serving as an external skeleton. The body is divided into three distinct parts—head, thorax, and body. The jaws are four in number—two upper ones, and two under ones; the under ones are lengthened, and form, as it were, a sheath to the tongue. The tongue is very long and slender, and admirably adapted for clearing the honey out of the deep nectaries of flowers, and also for curling up inside the mouth. Their attention should then be directed to the fact, that there is a membranous bag folded under the tongue. They should be told that this bag is capable of being greatly distended, and is used for receiving the honey before it is swallowed and consigned to the honey-bag. The bee has four wings—two upper ones and two under—the latter are much more delicate than the former. It has six legs; on the broad

surfaces of the hind-legs are two small cavities, which have a covering or lid of hairs. The children should be told that these are used for containing the bee-bread, with which it feeds the young, and which it obtains and prepares at the same time it is gathering honey, and that when the honey also is safely deposited in its appropriate place, the bee, quite loaded, flies home. The children's attention should then be directed to the eye; but before speaking of it they should be shown a piece of glass, of the shape of a double convex lens, be told its name, and that in the front part of our eye there is a very small capsule, or bag, filled with a transparent fluid, which is of the same shape—that in passing through this the rays of light meet in a point, or focus, which causes the reflections to be clear and distinct. When the children thoroughly understand this, they should be told that the eye of the bee is always immoveably fixed, which they might consider a great defect, but that full compensation is made in the numerous lenses with which it is filled, each, they will see, acting as a single eye, consequently the bee would not require to move its eye. The children should then be told that the bee was not always in the same form in which they see it, but that it had undergone three changes; that on its first appearance from the egg it was something like an earth-worm, and was called the larva; in the second change it is called a chrysalis, when it is quite torpid; and in the third it is the perfect insect or bee.

From knowledge previously acquired, the children will be able by this examination of the bee to state that it is a *true insect*, and also to give the three proofs: 1st. It consists of head, thorax, and body, while some insects, (improperly so called,) such as the spider and scorpion, consist only of head and body, the thorax being united with the head. 2dly. It has *six* legs—whereas the so-called insects have never less than eight—such are the spider and scorpion. 3dly. The spider and scorpion, and all the

so-called insects, never undergo any changes, for which the bee and all true insects are remarkable.

After having thus dwelt upon the *particular group* to which the bee belongs, the children should be desired to name the *great class* in which it is included, and also to give the reasons why so placed; viz. the bee belongs to the class "Articulata," because, 1st. It possesses what may be considered an external skeleton in its horny covering; 2dly. Its body is divided into several segments, or parts, which are joined or articulated together.

II. *Habits of the Bee*.—They are social insects, each individual working for the good of all; they are remarkable for their great industry and carefulness, and for the instinct they possess, as seen in the construction of their habitations,—a subject which should be taken up in a separate lesson.

LESSON III.—FOR CHILDREN FROM EIGHT TO TWELVE YEARS OLD.

CONSTRUCTION OF COMBS, ETC.

I. *Description of the hive*.—A hive, containing its combs, should be placed before the children, and they should be called upon to describe it; as, It is a conical shaped basket, resting upon its base, over which a rough covering of thatch is usually placed—a piece of perforated zinc is placed at the top, to admit the fresh air—and a small hole is made on one side, to allow the bees to pass in and out.

The interior of the hive should then be described by the children from their own observation; as, It contains several vertical plates called combs, which are full of small hexagonal cells. It should here be made clear to them that the combs are made by the bee, while the external covering or hive is provided by man.

II. *Examination of the comb*.—On examining the combs the children will discover that they are chiefly made of wax, but not exclusively, being smeared

over with a gummy substance. They should be told that this is called "propolis," and is obtained from the bark and buds of some trees, and serves to strengthen the combs.

III. *Examination of cells.*—*Classes of bees.*—The cells should then be examined as to their size; the children would soon see that there are three varieties in their size. They should then be told that there are three distinctions among the bees:—1st, There is the *queen bee*, who is the most important personage, and the mother of all; who, with the royal larvæ, occupies the largest cells, termed "royal chambers." 2dly. The male bees, who are a little smaller in size; the next sized cells contain larvæ that will produce these. 3dly. There are the workers, or the female bees, which are the smallest kind; eggs that will produce these are deposited in the smallest cells.

IV. *Uses of cells.*—The children should then be led by questioning to tell the three uses of cells. By referring to what had just been dwelt upon, they see that the first use was, *to contain eggs*. By asking what was done with all the honey that was gathered, they would give the second use, *to serve as storehouses for honey*. By questioning them as to what else the bee gathers from flowers, besides honey, and what was done with it, they would see that the cells also serve as receptacles for bee-bread.

V. *Description of the construction of combs and cells.*—After all this is quite clear to the children, the manner in which the combs and cells are constructed should be described to them, stopping at intervals in order to question them, that all may follow; thus, The wax makes its appearance in the form of eight scales upon the bee previous to the making of a comb—A bee ascends to the top of the hive, and attaches itself by the hind-legs to the roof; another follows, and by its hind-legs fastens itself to the first bee; a third follows the second, and so on, till a long string is formed, the last bee of which also fastens itself to the

roof, so that a kind of festoon is produced ; this festoon is filled up by many more bees : several such festoons are made in each hive—In this state the bees remain quite still, until the scales appear—A bee then separates itself from the rest, and by its hind-legs removes one of the scales, which is carried to the mouth by the fore-legs, where it is masticated and mixed with a frothy liquid, by which it becomes whiter and firmer ; it is then attached to the roof of the hive : the remaining scales are treated in precisely the same manner ; and then the bee retires, making way for another bee—Thus they continue to work until the whole block is formed. Before proceeding to the construction of the cells, the children should be well questioned on the preceding ; as, How does the wax appear?—In what way do the bees arrange themselves before commencing the combs?—How is the festoon commenced?—What is the next movement of the bees?—What process does the wax undergo before being attached to the hive, and what are the benefits ? &c. &c.

The manner of constructing the cells should then be described, as follows:—As soon as sufficient of the comb has been made to admit of the work of excavation, a bee commences making a cell ; and as the comb increases in size, the number of cells multiplies rapidly, more bees being able to join in the work.

VI. *Lessons of instruction.*—The children should next be assisted to draw lessons of instruction from what has been noticed respecting the bee.

First, They afford us a striking example of industry and carefulness—They do not lose one hour of the summer's sunshine, but are always busy gathering honey, and storing it up for winter's use, when they cannot leave their hives—From this we should learn never to idle away our time in youth, but embrace every opportunity of laying by stores of instruction, for our comfort in old age, when we are not capable of so doing.

Secondly, The examination of this wonderful little

insect should also enlarge our ideas respecting the infinite wisdom and goodness of God, Who giveth one of His smallest creatures such powers as are not only necessary to its own well-being, but can also contribute to the comfort of man ; showing that the very smallest, as well as the largest of God's works, demands our highest admiration.

SKETCH OF A LESSON FOR CHILDREN FROM EIGHT
TO TWELVE.

SCRIPTURE NATURAL HISTORY—THE LION.

I. *The habits, &c. of the Lion.*—The object of the lesson being to throw light upon Scripture, those points in the habits and character of the lion, which illustrate any passages, should be dwelt upon before referring to the texts.

Supposing the children to have been to the Exhibition, they should be called upon to describe the colossal lion, in order that their attention may be directed to those parts of the animal which are peculiarly adapted to its habits ; as—The large muscular legs and long bushy tail—The long sharp teeth and large curved claws. They should be told that under each foot there is a soft elastic pad ; and also that the sight and hearing of the lion are very acute.

The children should then be questioned as to the habits of the lion, its food, &c. If they are not able to answer, they must be told, themselves pointing out the adaptation of the organs to the habits as they occur ; thus :—The lion lives upon the flesh of animals killed by himself ; in capturing them, he approaches very stealthily, and often resorts to stratagem, such as concealing himself by the side of rivers, or behind bushes and trees ; when the victim is caught, he frequently kills it with one stroke of his paw or tail, and after tearing it to pieces, devours the flesh with the utmost voracity—The lion goes

in search of prey during the night, remaining in his den in the daytime, from which he issues about sunset and returns at sunrise—He frequently attacks whole caravans, and breaks into well-guarded sheep-folds, and never retires except fighting—When meeting an enemy he roars most terrifically, lashes his sides and the ground with his tail, knits his eyebrows, and thrusts out his large tongue—He despises weak enemies, and often pardons insults he might easily punish.

After these points have been dwelt upon, the children will very readily be led to see that the lion is very *strong, courageous, fierce*, and in some instances *noble* and *generous*. On the other hand, in some instances, he is *artful, cruel, and greedy*.

II. *Scripture texts*.—The children should now be directed to refer to passages of Scripture where the lion is alluded to in a different character according to its age.

1st. Deut. xxxiii. 22, where a *lion's whelp* is spoken of.

2dly. Ezekiel xix. 3, in which a *young lion* is mentioned, signifying one that has just left the lioness, and begun to seek its own prey.

3dly. Nahum ii. 12, where the word *lion* occurs, which means a full-grown and vigorous lion, eager in the pursuit of prey.

4thly. Hosea xiii. 7, in which the word *lion* also is mentioned; but here it means an old lion, or one in the full strength of its age.

The application of each of these passages should also be made clear to the children, after which they should be led to see that from the opposite qualities the lion at different times displays, it is used in Scripture to symbolize what is most good and sacred, as well as what is most destructive and terrible. They should then refer to the following texts, and having read each carefully, say what quality or character of the lion is alluded to. Thus:—

1st. Hosea v. 14, where the wrath of God is compared to the fury and fierceness of the lion. The children should be led to consider this as a warning for themselves.

2dly. Rev. v. 5. Here the majesty and might of our Redeemer are symbolized by the lion. The blessedness of putting our trust in such a powerful Friend and Protector should be dwelt upon.

3dly. 2 Sam. xvii. 10, in which a noble, generous, and courageous man is compared to a lion.

4thly. Prov. xxviii. 1, where the boldness of a lion is spoken of as symbolical of a righteous man whose trust is in God.

5thly. Numb. xxiii. 24; Deut. xxxiii. 20, 22. The lion is mentioned in these passages to show the strength and power of the Israelites. From which we may learn, that if our trust is in God we need not fear man. "If God be for us, who can be against us?"

6thly. Ps. civ. 20—23. These verses mark the nocturnal habits of the lion, and call forth our thankfulness that such blood-thirsty animals should seek their prey when man has retired to rest.

7thly. Ps. xxxiv. 10. We are told above that the young lions seek their prey from God; and it is here added for our great comfort, "They that fear the Lord shall not want any good thing."

8thly. 1 Peter v. 8. In this verse we have the lion in its savage, cruel, and artful disposition symbolizing Satan, who, like the lion capturing his prey, artfully watches, and savagely and cruelly pursues the destruction of souls. From this we should learn to be constantly watching and praying, lest we fall into his hands when we least expect it.

9thly. Ps. x. 9; xvii. 12; xxii. 13. The dispositions of wicked men are compared to the watchfulness and greediness of the lion. This should teach us to cultivate a benevolent disposition; for it is said of the path of holiness which leads to life eternal, "No lion shall be there." Isa. xxxv. 5.

LIVERPOOL.

LESSON SUGGESTED BY THE MODEL IN THE GREAT EXHIBITION—
FOR CHILDREN FROM TWELVE TO THIRTEEN.

I. *Model examined*: 1st, *the Town*.—Children observe and describe the model—Notice the sheet of water dotted with ships—The Mersey—on the right bank of which the town is situated—Their observation directed to the extent of the town along the bank of the river—This ascertained by the scale, with the nature of which the children will have been already acquainted—Actual distance 3 miles—The breadth, inland, 1 mile.

Children next directed to point out the principal buildings—Hospital—Market-place—Prison—Exchange—Lyceum—Athenæum, &c., and led to notice the classical style of the architecture—Short account of each, particularly the two last, in connexion with the fact, that Liverpool has done more to promote the education of its inhabitants than any provincial town, Manchester (perhaps) excepted—Arrangement of the houses in streets and squares—Appearance of the different quarters noticed, and children led to determine the localities of the opulent and those of the working classes—Number of warehouses—Wholesale nature of the business of the place inferred from their appearance—Number of churches and other places of public worship—Population mentioned, and conclusion drawn as to the provision made for religious service and instruction.

2d. *The Docks*.—These, the great feature of Liverpool, on account of their number and magnitude—Children determine the length to which they run along the river, generally by comparison with the extent of the town; tried by the scale, these extend 7 miles in that direction—Height of docks mentioned and accounted for, by reference to the high tides on the

western coast—Difficulties in the navigation of the Mersey explained, and necessity for constructing docks inferred—Some account of the “Old Dock,” the first in England, opened in 1690—Other docks distinguished by the “trade” to which they are appropriated.

II. *Early History*.—The information included in this head must be given by the Teacher, but it will afford good opportunities of drawing from the children their remarks on what is communicated. It should not be simply apprehended, but their powers should be exercised upon it. Liverpool was not known in the time of the Conqueror, no mention of it in the “Dooms-Day Book,” though several adjoining places are named; anciently great part of the site was a marshy pool filled by the rising tide—Doubtful derivation of the name, whether from Ller-pool or Lever-pool—Tradition connected with the latter name adopted by the inhabitants, and recorded on the Town Seal.—Liverpool became of importance in the reign of Henry II, as a point of communication with Ireland—Obtained a charter from him—A second from John—And a grant from the third Henry, constituting it a free borough for ever—Seems to have declined after that time—Described as “Her Majesty’s poor, decayed town of Liverpool,” in a petition to Queen Elizabeth—Had then a chapel, but no church, 138 inhabitants, and two or three ships, average burthen 223 tons—Improvement of condition from this period—Made a parish at the end of the Seventeenth Century, having then a population of 5,000, or according to some authorities, 7,000—Has been nearly re-built within the last half century.

III. *Causes of its present Greatness*.—1st. Position pointed out on the map—1, Maritime—What the advantages of that—2, Western—Convenient for the maintenance of commercial relations with numerous countries, as with *North America*, whence it obtains nearly all its cotton—also timber, wheat, skins—

With *South America* and the *West Indies*, which send coffee, sugar, tobacco, spices, &c. From previous advantages, has also commercial relations with *Spain, Portugal, and Southern Europe*, whence come wine, fruits, wool, silk, &c.—To all these places Liverpool exports cotton and woollen goods, hardware, and other articles of general commerce—Its position also makes it a central port to all the coasts of the Irish Sea, uniting in itself the commerce of England, Scotland, and Ireland.

2d. *Establishment of manufacturers in its neighbourhood.*—Cotton in Lancashire—Woollen in the West Riding of Yorkshire—Pottery and hardware in Warwick and Staffordshire—These conveyed to Liverpool and shipped to all the countries before named—Description of the growth and extent of the cotton manufacture, and children led to see the effect which the importation of cotton, and the exportation of cotton goods, in such quantity, must have on the prosperity of the town.

3d. *Influence of Railways and Canals.*—These, as well as the first dock, begun at Liverpool—Sanky Canal the first—Made 1755, to connect the coalmine of St. Helen's with that town—This, and other canals, connecting it with the manufacturing districts pointed out on the map—Canal and land conveyance of goods contrasted, to show the superiority of the former, in respect of cheapness, safety, and convenience, especially where goods are to be shipped.

First passengers' railway, 31 miles long, connecting Manchester with Liverpool, 1830—The accident that threw a gloom over the opening—Why made? On account of the necessity for cheap and speedy communication between the manufacturing districts and their shipping port—Show the re-action of both railways and canals on Liverpool, by pointing out on the map the greatly increased circle of country which they bring into connexion with that port, and the consequent increase of imports and exports—In all

this we see that prosperity is produced by commerce, but commerce is dependent on peace—Peace enriches—War impoverishes—Peace increases—War depopulates—Peace constructs—War destroys.

IV. *Summary.*—The lesson reproduced by the children, under the heads given on their own slates.

INTRODUCTORY LESSON ON GEOGRAPHY.

THE MAP OF THE WORLD.

FOR CHILDREN FROM EIGHT TO TEN YEARS OF AGE.

I. *Comparison of globe with the map of the world.*

1. Lead the children to see the relation between a map of the world and the globe. The former a representation of the latter on one flat surface; this shown by cutting a sphere in halves, and presenting the edges of their convex surfaces in contact.

2. Show from the map that it is divided into Eastern and Western hemispheres (the children's knowledge of form applied to the use of the term hemisphere)—That the Eastern contains the Old World, the Western the New—Why the latter is so called?

3. By dividing a sphere across, the children are led to see that the world may be represented as divided into halves in the same direction, constituting the Northern and Southern Hemispheres. The circle that marks this division is called the Equator. Lead them to see the applicability of this term. Next lead the children to observe the distribution of the land and water: greatest quantity of land in northern hemisphere; of water, in southern.

4. By means of a globe, or appropriate maps, lead them to see that if London were made the centre of a hemisphere, almost all the land would be in that hemisphere, and the water in the other.

5. Peninsulas pointed out, and by a chain of questions children led to see that nearly all the great peninsulas point southwards. Exceptions named and pointed out.

II. *Comparison of the two great Continents.*

Direct attention to the map, and lead the children to observe that each hemisphere consists of two large portions, joined by isthmuses. The Eastern Hemisphere, consisting of Europe and Asia, joined to Africa by the Isthmus of Suez; the Western, of North and South America, connected by the Isthmus of Panamá.

Call attention to the fact that the most extensive groups of islands lie on the eastern side of each continent: on the eastern side of Asia—the East Indies; on the eastern side of America—the West Indies. Why so called?

Also direct attention to the general direction of mountains; in the Old World, from east to west; in the New, from north to south. Refer to the bones of animals, and show, by comparison, that as they determine the shape of the body, so mountains determine the direction of the land: hence the greatest extent of land in the Old World from east to west; in the New, from north to south.

Lead the children to compare the direction of the rivers in the Old World generally from north to south, or from south to north; in the New, from west to east, or from east to west. In both cases, more or less at right angles with the mountains in which they rise.

III.—1. Lead the children to make a comparison as to the relative quantity of water and land on the globe; next show that, but for the interruption of land, there would be but one expanse of water; but, by the intervention of the continents, the water is divided into five oceans. Position of each pointed out and described by the children; names given, and why so called.

2. Comparison of the Atlantic and Pacific. Draw

from the children that the greatest length of the Atlantic is from north to south ; of the Pacific, from east to west. That the whole coast of the Atlantic, especially on the north, is far more broken and indented than that of the Pacific. That large arms from the Atlantic stretch far into the land on either side—the Baltic and Mediterranean on the east, the Caribbean Sea and Gulf of Mexico, and Hudson's and Baffin's Bays ; while the arms of the Pacific are few, and, with the exception of the Gulf of California, very open to the ocean. Question them as to the uses of the ocean to man, and lead them to see that it is a storehouse for a certain kind of food, a great reservoir for rain to water the earth—for the treasures it contains ; and lead them to see the importance of the Atlantic, as forming the highway of intercourse between the most civilized nations of the world.

SKETCHES OF LESSONS ON THE LARGE GLOBE IN THE EXHIBITION.

FOR A CLASS OF YOUNGER CHILDREN.

In order to give the following lesson profitably, the teacher should be provided with a globe in relief, such as may be procured at the Depository of the Christian Knowledge Society or that of the National Society.

LESSON I.—GENERAL APPEARANCES OF THE EARTH AND SKY.

I. LET the children suppose themselves out in an open space, and get them to name all that they observe, classing at last the whole under the two words—*Earth* and *Sky*.

II. *The earth*.—Lead them to see by observing the globe that the earth appears to be a vast spherical

body, not level, but full of irregularities—How are they caused?—By the ground rising into mountains, hills, and eminences, or sinking down into valleys; and also by rivers cutting its surface, and running in every direction.

III. *The sky*.—Children next to observe that above the earth spreads the sky,—they describe it with the aid of the teacher as a vast dome, which at the utmost limit of our view appears to touch the ground, and to form with it a circle. Having developed the idea of horizon, and seen that the children clearly conceive it, give them the name of *horizon* with its derivation, so leading them to see the connexion between the name and the idea. The children to state what they have observed on attempting to approach the horizon; leading them to see that it is not stationary, for in attempting to approach it, it appears to flee before us and follows behind us, so that we all occupy the centre of a horizon—When should we get the least extensive, and when the most extensive view of a country? Leading them to the conclusion that the horizon is not always of the same magnitude, but is most extensive when the observer is on an eminence or vast plain, with nothing to obstruct his view; whilst in a valley the horizon becomes very limited. Direct attention to the *zenith* by speaking of the most elevated part in the dome of a building, that as there is a highest point there, so in the celestial dome there is a point which appears to be the highest, and which is situated directly above the head of the observer. Thus having developed the idea, give the name. By referring them back to the horizon, which appears to move as we move, lead them to see, as a conclusion drawn by themselves, that the zenith must of necessity move also, and that our zenith as well as our horizon depends on our position. Direct the children's attention to the apparent daily course of the sun from one part of the horizon to the other, getting them to say what they have observed,

that he rises in one part of the horizon, advancing gradually higher and higher in the heavens, until he has arrived midway in his course, and then gradually sinks, until he disappears at last from our view. See that they know that the point where the sun rises is called the *east*, and where it sets the *west*. Also that if from the place where the sun is at noon, an imaginary line be drawn perpendicularly to the horizon, the point where it touches is called the *south*, and extending the line through the centre of the sun to the opposite point, where it meets the horizon is called the *north*. Thus west is opposite the east, and north opposite the south—dividing the earth into four equal parts.

IV.—*Summary*.—Call upon the children to say what they have learnt—That the earth is a globe encircled by the sky—That the circle where the earth and sky seem to meet, and which bounds our view, is called our horizon—That the highest point immediately above our head is called our zenith—That the sun's apparent course is from east to west—That it appears gradually to rise higher and higher, and at noon arrives at a point from whence if an imaginary line be drawn to the horizon, it would meet the south, and then through the centre of the sun to the opposite point it would touch the north.

This summary the children are required to reproduce in writing.

LESSON II.—THE SHAPE OF THE EARTH.

I. Ascertain from the children their notions, (if they have any,) respecting the shape of the earth, and prepare them for receiving correct ones—Enumerate some of the absurd views held in former times respecting it, as—Some persons thought it resembled a pillar or drum—Others, that it was like a dish, or an egg, floating on water—Others, that it was a flat

body, supported by air or by pillars, which extend downwards without end—Others, that it was an extended plane; of a square form, surrounded by a wall, on which the sky rested, which is supported by pillars. Question the children as to the cause of these erroneous ideas. They could not see the whole of the earth, and they arrived at their conclusions by viewing what was contained within their own horizon, and their own suppositions drawn from what they saw—Tell them that we are often deceived by appearances, and prove this by showing how a stick appears broken in water—A coin double when under a glass.

II. Tell them, that though our ancestors made these great mistakes, there are facts discovered which have enabled us to determine the shape of the earth. Ask if any of them have ever been on an eminence, and what they have observed on ascending or descending it, with respect to the surrounding objects—That as they ascended, the tops of the objects on the other side appeared first, then a little more of them, and a little more, until they had gained the summit, when the whole was visible; and in descending, the lower parts were lost sight of first, then the middle, and last of all the top—Then tell them that this is the way the land always appears to mariners approaching it from the sea, and also the way in which a ship appears to us when receding from or approaching to the land—Endeavour to lead the children to see from this that the earth is of a spherical form—Then let them know that the earth has been circumnavigated, pointing out the courses of Captain Cook and others—Coming to the conclusion, that unless it were globular this could not have been effected—Again, tell them that when travellers or voyagers proceed to a considerable distance from north to south, or from south to north, a number of new stars successively appear in the heavens in the quarter to which they are advancing, and many of those in the opposite quarter gradually disappear; from this fact lead the

children to conclude that this could not happen if the earth were a plane; and from hence to infer its spherical form.

III. *Summary*.—Children required to reproduce the lesson by answering the following questions—What false opinions have been held as to the form of the earth?—What facts prove that it is of a spherical form

LESSON III.—DIVISION OF THE EARTH'S SURFACE INTO LAND AND WATER.—LAND.

I.—Get the children to examine the globe, and say what they observe as to its surface—That it is covered with land and water—That the proportion of water to land is great—What proportion?—Two-thirds water and one-third land—That the land is not collected into one mass, or the water into one place, but divided into portions—That these portions are not regularly distributed over the surface of the globe, but that the greater portion of the land lies in the Northern Hemisphere, and that the Southern is almost covered with water. All this may be drawn from the children by their observation of the raised globe.

II. *The land*.—The children further notice from the globe that the land is divided into masses which vary much in size; of these there are two which are exceedingly large, and extend over a great space without being interrupted by water. Having observed the character of a continent, the name should be given, and its meaning shown from its derivation—The name then given by which each continent is distinguished; as, the one, because it was known by the ancients, and lies in the eastern part of the world, is called the Old, or Eastern Continent; whilst the other, because it was found only 350 years ago, and lies in the western part of the world, is called the New, or Western Continent. Australia may now be observed—Its intermediate size, between

the largest masses and the others, noticed, and the children told that it is usually regarded as the third continent. The smaller masses are called islands; and the very smallest, which can hardly be seen on the globe, are called islets—Compare the continents, islands, and islets—Look further, and compare the islands—Some stand alone; others in clusters, called Groups; and in several places there are clusters of these groups, called Archipelagoes. Why so called?—Make the children count the archipelagoes—Point to our own island—To Great Britain—To Ireland; its groups—The Orkney, Shetland, &c. &c.—The whole are called the British Archipelago.*

LESSON IV.—DIVISION OF THE EARTH'S SURFACE INTO LAND AND WATER.—WATER.

I.—Direct next the attention of the children to the *water* on the globe—Taken together, called the sea or ocean—Not all together, but separated by the land, especially by the Old and New Continents—The several portions pointed out, and their position described; as, one situated between the western side of the Old Continent and the eastern side of the New; another between the western side of the New Continent and the eastern side of the Old; another surrounding the northern extremity of the world, &c. &c.—Next, their connexion observed; this connexion making, strictly speaking, only one ocean on the surface of the globe; for convenience, however, generally divided into six, and each called an ocean—Lead the children to see that whilst the whole mass of water is called *the ocean*, that the different parts of it are called oceans, and have particular names—The oceans pointed to again, and the names given; as, the Pacific, the Atlantic, the Indian, the Southern and the Northern and Southern Icy Oceans,—the reason given for these names being applied, as far as

* The summary is deferred until the conclusion of the next lesson.

they can be understood, by the children. Further, make them observe that each ocean branches out and forms subdivisions—That these extend into the land; are changed in size and outline—Each of these subdivisions spreads out again into smaller branches; the larger called Seas, and the smaller, Gulfs and Bays—The ocean and other branches are often connected by narrow channels, called Straits. Direct their attention to one strait near England, across which so many of their French neighbours have sent articles for the Exhibition, and have come to visit it themselves,—the Straits of Dover.

Direct their attention to the continents, where they will observe more water,—smaller and larger sheets, all surrounded by land—Most numerous towards the northern parts of each continent—These are *lakes*, but lakes far larger and deeper, if not more beautiful, than our English lakes.

Lastly, direct their attention to the manner and extent to which the land is intersected by rivers—The direction of these—Their relative length, and the oceans into which they fall—Compare them as to their number and size in the two continents.

II. *Summary*.—Children required to reproduce the lesson by answering in writing the following questions:—How is the surface of the earth divided?—What are the different portions of land called?—Of water?—How is the word ocean applied? &c. &c.

THE BALTIC AND THE MEDITERRANEAN WITH THEIR SURROUNDING COUNTRIES.

A CONTRAST SUGGESTED BY THE PRODUCTIONS WITH WHICH THEY
FURNISHED THE GREAT EXHIBITION.

LESSON FOR PUPIL TEACHERS.

I. *The waters.*—(Information given to the pupils, or already known, and drawn from them.) The Baltic—shallow, brackish, frozen for a great part of the year; with a surface-current flowing into the Atlantic, and an under-current supposed to flow from the Atlantic into it. The Mediterranean—deep, salt, never frozen; with an upper-current flowing into it from the Atlantic; an under-current is supposed to flow in the opposite direction.

To understand the cause of difference of depth, refer to the fact that a steep coast is generally accompanied by deep waters, whether in lakes or seas. The coast of the Baltic is low and flat; the land, except on the Swedish coast, elevated but a few feet above the water, in some places lower than the water. The Mediterranean embedded between the highlands of Southern Europe and the great chain of Atlas—forming the great water-valley of the Old World—the water deepest where it washes the Alps, the Apennines, and the Atlas. The pupils to infer the difference in saltness, temperature, and direction of currents, from the difference in the amount of fresh water which they receive proportioned to their bulk, the difference of climate, and consequent difference in the amount of evaporation from each.

II. *Adjacent countries and their productions.*—Direct attention to the difference in physical character and climate of countries on the Baltic and Mediterranean, and thence lead the pupils to determine the animal

and vegetable productions characteristic of each—Of the north, corn of all kinds, flax and hemp, oils, resins, and other productions of wood, oxen, hogs, bears, reindeer, besides various fur-producing animals—Of the south, corn, fruits of all kinds, silk, cotton (to a limited extent), dye-woods, oxen, sheep, goats, antelopes, lions, &c. Also give information as to the minerals which they produce in the greatest abundance; as iron, copper, lead, &c. in the north—marble, sulphur, slate, quicksilver, &c. in the south. From the knowledge thus acquired let them determine generally the employment of the people; also what raw material and manufactured articles each would be likely to exhibit. The correctness of the conclusion may be tested by reference to what has actually been sent from the Baltic and Mediterranean to the Exhibition. Make a general comparison as to the value and importance of raw materials and manufactured articles furnished by the two localities, and let the pupils determine the present state of arts and manufactures in the countries under consideration. Put questions to bring to their recollection the barbarism of the Baltic in former times, when the grandeur and civilization of the Mediterranean was at its highest, that they may be enabled to infer, that while the arts and manufactures are rapidly advancing on the shores of the former, they are declining on those of the latter.

III. *Cause of the former prosperity of the Mediterranean.*—Refer to the succession of great commercial cities which sprung up from time to time on the Mediterranean—Tyre, Carthage, Athens, the Grecian cities of Asia Minor—Alexandria, Rome, and later, Venice and Genoa. From this consideration lead them to see that through all the struggles for empire between different nations, the commercial metropolis of the world continued somewhere on the coast of that sea. Refer to its position as the medium of communication between the most civilized nations

of the world, and particularly as the only way by which the nations of Western Europe could communicate with those of the East; and thence let the pupils infer the cause of its greatness, and why it retained it so long.

By giving examples of the connexion between commerce and the arts and sciences, lead the pupils to draw the inference, that those cities which for the time being were mistresses of the former, were, generally speaking, the most renowned for the latter—that the one advances or declines with the other.

IV. *Cause of its decline.*—Show how the state of science on the shores of the Mediterranean, and the experience acquired on its waters, prepared for the navigation of the Atlantic; led to the discovery of the passage to the East Indies round the Cape of Good Hope, by Bartholomew Diaz and Vasco de Gama; to that of America, by Columbus: and let the class trace the effect of these discoveries,—1st, on the Mediterranean, by removing the great theatre of human enterprise from it to the Atlantic; 2dly, on the Baltic, by bringing commerce and the great commercial nations nearer to its coasts; and further, that the commercial prosperity once possessed by the great cities of the Mediterranean was transferred to those on the shores of the Atlantic.—Instances: New York, New Orleans, and others, on the west; London, Amsterdam, Liverpool, &c. on the east.

Point out the position of England with reference to the other commercial nations of the world, with a view to show that it has succeeded to the central position once held by the great cities of the Mediterranean, and that London is perhaps a more eligible site for a Great Exhibition than any other metropolis in the world.

GEOGRAPHY.

TO BE GIVEN TO A CLASS OF STUDENTS.

INDIA AND ITS PRODUCTIONS.

I. *Dimensions—Position—Boundaries.*—By means of a map of India, the students should be led to describe the peninsula of India. 1st. As to its length, average breadth, and extent. 2dly. As to its form, that of a wedge or point, running far into the Indian Ocean. 3dly. As to its position with respect to the equator, which is from 7° to 35° N. lat. 4thly. As to its boundaries, which should then be named.

II. *General aspect and climate.*—The latitude being determined in the foregoing head, the students should name any physical features which may influence climate—They should point out any great and abrupt elevations—They should point out and name the great plains of India, which are exposed to the scorching rays of a tropical sun, together with the great chain of the Himaleh mountains on the north, its height, and the various branches sent off to the north-east and north-west of the peninsula—They should next describe the position of the hill country with respect to the mountains, and with respect to the plains—Those regions where mountain streams might be found, should be named—The principal tablelands should be pointed out and named—The students, with the help of their maps, should trace the course of the principal rivers—They should notice particularly the Ganges—Its many mouths—The Sunderbunds should be given by the teacher—The climate should then be described as far as results from position, and from the physical features before named—The students should also tell why the climate of India must be varied—They should tell the influence

of the various winds that blow, both from the ocean, and over the great plains—And how a succession of mountains and plains can influence climate—Those parts of the country where the heat is greatest should be named—The causes for great heat given—Why the hilly regions enjoy a delightful climate should be told—The class should be led to speak of the mountain chain in the south, and should tell what influence it can have in rendering the provinces of the interior either wet or dry.

III. *Productions, both animal and vegetable.*—There will be no difficulty in making the class see, that as the climate is varied, so also are the productions—They should point to and name those parts of India, where they might expect to find the following :—Rice, sugar-cane, indigo, wheat, maize, pears, apples, walnuts, grapes, sycamores, poplars, oaks, pines—Where they would expect to find the camel, goat, elephant—Where such animals as the panther, hyena, jackal—The insects might be named, dwelling especially on those which are useful.

IV. *The exports of India.*—As the principal exports are either animal or vegetable, a knowledge of the last head will at once lead to this. The students should name the different oils, gums, and resins, produced from trees, as well as the different kinds of timber—The animal substances—ivory, silk, wool, shawls from cashmere, &c.; naming the animals from which they are obtained. The entire lesson should be written out from memory by the students, and recapitulation made, previous to giving another lesson on the same subject.

V. The students should next name the various articles seen in the Indian department at the Exhibition—The different kinds of oils—Cloths made of different trees—Gums—Silk and glossy cloths; as well as the many goods made of fancy wood—Some of the animals and their productions should be named, as, the tiger, the elephant—The tiger's teeth and the elephant's tusks, &c.

ITALY AND ITS PRODUCTIONS.

A SERIES OF THREE LESSONS FOR ELDER CHILDREN.

LESSON I.

I. *Situation, boundaries, and general appearance.*

1. *Situation.*—The children, from a careful examination of the map, to describe the situation of Italy: As, In the south of Europe—In the Mediterranean Sea—The extreme southern point stretching far towards Africa.

2. *Boundaries.*—North and north-west by the Alps, which separate it from Switzerland and Austria—West and south by the Mediterranean—East by the Adriatic, separating it from the opposite shores of Greece and Illyria.

3. *General appearance.*—The children, from an examination of the map, to describe this. A long narrow portion of land, extending into the sea, by which it is almost surrounded—Appears in shape like a boot. The children should try to form some idea of the length and breadth of Italy: and then be told that it is 720 miles long; 380 miles broad in the north—The extreme south very narrow, being in one part less than 20 miles across—The average breadth is about 100 miles—Coast extensive, but not much indented. The children will notice that Italy appears to be a mountainous country—The Alps in the west and north-west consisting of the Maritime Alps—Cottian Alps—The chain of the Apennines traverses Italy from north to south, dividing the country into two slopes—Inference drawn by the children—The rivers will run east or west across these slopes; those on the east falling into the Adriatic Sea; those on the west into the Mediterranean—This proved by reference to the map. Question the children as to what they should expect with regard to the length, volume and rapidity of these rivers.

As the country is not very wide, and is divided into two slopes, the rivers must be short—Running from lofty mountains, and having but a short distance to flow before they reach the sea, their course must be rapid. The children will be led to infer from the fact of these rivers being short, that there will be very few, if any, tributaries—Consequently the volume of water will be small and the rivers narrow—From this circumstance and their rapidity, little navigation—They will notice that one river, viz. the Po, appears considerably longer than any of the others—Why is it so?—It drains all the waters of the Alps and northern Apennines—Flows from north to south-east, and consequently has a longer tract of country to pass through. The children to be led to observe that this river has many tributaries, and that there are also many smaller rivers in the north. By comparing this part of the country with the remainder, they will see that it is much better watered. Result—The northern part of Italy expected to be the most fertile.

II.—*Climate*.—The children having in a previous lesson been made acquainted with the various causes affecting climate, will be able to form conclusions respecting the climate of Italy.—1st. Its position with respect to the equator—Increasing heat—2d. Almost surrounded by the sea—Effect—Equalizing the temperature—3d. Protected by mountains in the north. Consequence—Sheltered from the northern blasts—4th. Prevailing winds, south and south-west; the former blowing across the hot sandy desert of Africa—Hot and dry. But where must they pass over before they reach Italy?—The sea, which will moderate these hot winds. The winds which blow from the south-west coming over a greater expanse of water, are cooler, and bring with them clouds charged with water, and being intercepted by the mountains as they pass over the country, break and descend in rain. Result—Tem-

perature decreased—The land fertilized—The South of Italy subject to a very hot wind called the Sirocco, which blows from Africa. Conclusion drawn by the children from these combined causes—That the climate of Italy must be warm and salubrious, except in the south, where the heat is at times most oppressive.

III. *Summary.*—The heads of the lesson to be written on the large slate, with the aid of which the children will recapitulate the lesson, in a condensed form, first orally, then in writing.

LESSON II.—NATURAL PRODUCTIONS OF ITALY.

I. *Vegetable productions.*—Trees, fruits, and grains named by the children. Question the children upon the preceding lesson, so as to lead them to see what vegetable productions might be expected from a country possessing the advantages of Italy—Make them name some fruits and trees peculiar to warm climates; as, grapes, plums, oranges, lemons, figs, pomegranates, olives,—these all grow in Italy—The mountains in the centre of Italy not being more than 9,000 feet in height, what conclusion they would draw regarding the vegetation of such mountains, situated in so warm a climate—They would be covered with verdure throughout the year—On the lower slopes are the vine and the olive; higher up, the various forest trees, among which are the chestnut, the oak, beech, and the ash. In considering the countries producing the different kinds of grain, the children will be able to name the grains cultivated in Italy; as, wheat, rice, and maize, which are very plentiful.

II. *Mineral productions.*—As on the nature of hills and mountains depend the mineral riches of a country, the character of the Italian mountains being described to the children, they will be led to infer what mineral wealth will be likely to be found there.

From the point where the Apennines branch off from the Alps to the country of Florence, they are composed of strata and beds of slate limestone, and magnesian rock, which formation generally contains gold, silver, tin, and copper—The centre of the range consists of white limestone, usually containing lead—That part of the range which is towards the south is composed of clays, gravel, and sands; in this formation neither metals nor coal are ever found.

The Apennines viewed as a whole, and compared with the mountains of other countries, cannot be said to be rich in metals—Some little quantity of gold, silver, and copper is found; also some iron, but this is mostly obtained from the Isle of Elba, which has always been noted for it—They abound in marble and sulphur; the most beautiful kind of the former is procured from quarries in the Apennines, near Carrara, in Modena; the latter chiefly from Sicily—Clays, sandstone, agates, and other ornamental stones, are found in various parts of Italy.

III. *The employments of the people, resulting from natural productions.*—Question the children so as to lead them to discover the probable occupations of a people in such a country; as,—

1st. *In dairy farming.*—The valleys being fertile, affording good pasture for cattle. Preeminently among these are the cows fed in the pastures of the Parmesan and the country round Lodi, which produce the cheese called Parmesan, considered superior in richness and flavour to any other in the world. Thus, some of the inhabitants are occupied in dairy work.

2dly. *In tending sheep.*—As there is good herbage upon the mountains, flocks of sheep are found grazing in those districts, and their wool is generally esteemed for its fineness—Whom would this employ?—The shepherd to tend the sheep, and also the weaver to manufacture the wool into clothing.

3dly. *In husbandry.*—The vines and grains requiring the care of the husbandman.

4thly. *In tending silk-worms.*—Mulberry-trees grow in great abundance—What insect feeds on the leaves of these trees?—The silk-worm, an insect which requires attention and care. The children will see that many of the people must be employed in attending to the rearing of the worms.

5thly. *In the manufacture of silk.*—The children, being acquainted with the different processes which the silk undergoes before it is suitable for article of clothing, will see that there will be persons required to wind the silk from the cocoons, others to spin and weave it into silks, satins, velvets, &c.; and,

6thly. *In dyeing.*—As these must be of different colours, the dyer will be employed.

7thly. *In cabinet work.*—What would the different kinds of wood be likely to be manufactured into? Here tell the children that the Italians are very ingenious in cabinet work and carving.

8thly. *In the manufacture in straw.*—What articles for wear they have seen made of straw? viz. hats and bonnets. Tell the children these afford a most valuable employment to a great number of country girls, particularly in the neighbourhood of Tuscany.

9thly. *Working in minerals.*—A little trade is carried on in the silver manufactures—The Brescian iron has been worked with considerable diligence, being formed into the steel known under the name of Brescian, and into various descriptions of hardware.

10thly. *Sculpture.*—Marble being plentiful, affords material for the sculptor, and sculpture is an art in which Italy excels.

11thly. *Architecture.*—Limestone is abundant. What use is made of it? It is used for architecture. Italy is enriched with beautiful monuments, and other specimens of this art.

12thly. *Manufacture of porcelain.*—Much porcelain is made there. Why? Because the different clays necessary for that manufacture are in abundance in the mountains; the chief is that made at Naples, which

may be said to surpass any in Europe—The potteries at Teramo are also very extensive.

13thly. *In precious stones.*—The agates are used for ornamenting tables, boxes, &c.—The making of cameos and mosaics, which elsewhere ranks among the fine arts, is carried on to such an extent in Florence and Rome as to make them articles of trade.

IV. *Summary.*—This lesson to be recapitulated in the same manner as the former lesson.

LESSON III.—CHARACTER OF THE PEOPLE, COMMERCE, ETC.

I. *National character.*—The Italians were at one time reckoned amongst the most polished and refined nations in the world, but they are now in a very degenerated state—Although the Italians frequently display great ingenuity and natural ability, yet the predominant feature in their character is that of extreme indolence and love of pleasure—They evince a great fondness for music, painting, and sculpture, and if industry were combined with taste, they would doubtless excel in other things as much as they do in these. Speak of the domestic comfort in English homes—Whence does this arise?—From the industry of the people—By contrasting this character with that mentioned above, draw from the children the kind of homes they would expect to find in Italy.

The lower ranks form the mass of the Italian population, with scarcely any intervening class between them and the nobles—Why so many poor?—The result of indolence. Here elicit from the children by questions the means such a people in a state of poverty would be likely to resort to, in order to obtain a livelihood; as, begging, theft, &c. Tell the children that the Italians practise all these. In consequence, dens of banditti infest many of the roads, which are obliged to be guarded by soldiers, at the distance of every mile, or no one could travel

in safety along them. This often leads to assassination, a practice which prevails in no small degree amongst this class. Thus the children will see the numerous evils arising from indolence.

Although the vices of the Italians are many, we must not overlook the good traits in their character—Temperance must be admitted to be one of their virtues—Notwithstanding the abundance and cheapness of wine, intoxication is scarcely known even among the lowest ranks—And in addition to this, charity and humanity appear conspicuous virtues in the nobles—Charitable institutions are numerous in the principal cities, from which, as well as from the convents, a great deal of bounty is bestowed upon the multitude of beggars; but it is done indiscriminately—The children to state what evils would arise from this—They will readily perceive that idleness and beggary will be encouraged, instead of checked as they should be.

II. *Commerce.*—The children in a previous part of the lesson having been made acquainted with the productions of Italy, will be able to name the various commodities our merchants would be likely to bring from that country—As, raw silk, wines, olive oil, grapes, figs, oranges, lemons, rice, marble, hats and bonnets, known by the name Leghorns and Tuscans—Tell them that kid and lambskins are also sent from Italy to England—What articles would the Italians be glad to have from us? and why?—Manufactured goods, as machinery and other iron works—Because iron is not abundant there, nor coal, which is necessary in the manufacture of this metal—England also supplies Italy with manufactured cotton and woollen goods—Machinery is scarce there—Wool and cotton are also far from abundant, so that they can procure these articles at a cheaper rate from England than they could make them themselves—Thus commerce is promoted, and the wealth and comfort of each country increased.

III. *The various productions of industry exhibited in the Italian department of the Crystal Palace.*—The children to be called upon to enumerate, (from what they know of the productive industry of Italy,) the articles they would expect to see, sent to the Crystal Palace. Many of the children will probably have been there; and will be able to describe them—As, specimens of silk in all its stages, raw, spun, and woven—Dyed silks and velvets—Some few woollen goods—Various articles of furniture manufactured from the different kinds of woods, showing the skill of the ingenious—Specimen of mosaic work—Fancy articles inlaid with agates and cameos—As they excel in sculpture, statuary would be exhibited—Marble tables and slabs—Specimen of carved work—Chemical productions associated with the sulphur ores—Iron ores—Steel—Silver plate.

IV. *Summary.*—Lesson to be recapitulated, and reproduced, as before stated. In addition to this, the children now to commit to memory from book—The boundaries of Italy, its mountain-chains, lakes, rivers, divisions, towns, &c. having first determined their exact and relative situation on the map; not only knowing where they are when they see the map, but having endeavoured to transfer the picture of the map to their own minds.

SKETCH OF A LESSON ON RUSSIA AND ITS PRODUCTIONS.

TO BE GIVEN TO A CLASS OF PUPIL-TEACHERS IN THEIR FIRST YEAR.

REMARKS.—The object sought in this Lesson is to give the Pupils a general idea of the different products of Russia, and the present state of her manufactures, by means of the articles contributed by that country to the Great Industrial Exhibition of 1851. Specimens of the various mineral products of Russia should, as far as possible, be procured.

THE MINERALS OF RUSSIA.

I.—SET the children to mention the different minerals they saw in the Russian department of the Exhibition; the iron and copper ore, the precious stones, opal, brilliants, diamonds, emeralds, and a large transparent stone of a greenish hue, called the Uralian Pharmacite; the specimens of rock-salt, granite, clay, alabaster, and limestone; the oxides of iron, and of copper, which contain from $2\frac{1}{2}$ parts in 100, to 35-36ths of copper, and the petrified wood; also the chairs, tables, vases, &c. of a beautiful green substance, which takes a high polish, and is called malachite; the sheet-iron, the cannon balls, the different mathematical and surgical instruments, and the numerous bars and rods of iron, from Siberia, whence also was sent to the Exhibition the iron ore, and the sheet-iron. The above list to be written on the slate, in the order mentioned, and the pupils should afterwards be led by questions to classify them as follows:—

NATURAL.

Iron ore.
Copper ore.
Oxides of iron and copper.
The precious stones.
Rock-salt.
Granite.
Limestone, marble, &c.
Fossil-wood.
Malachite in a raw state.

MANUFACTURED.

Bars and rods of iron.
Sheet-iron.
Cannon balls, &c.
Mathematical instruments.
Malachite chairs, &c.
Jewellery.

The pupils to describe more minutely the articles before-mentioned, and the following information given by the Teacher:—Not only iron and copper, but gold, silver, and other metals are amongst the mineral treasures of Russia, (6-7ths of the gold found in Europe is thence procured;) and coal, too, is found in great quantities in Siberia—Copper is very abundant, and in the copper mines is found in considerable quantities the malachite, or jasper, a substance for which Russia is remarkable—(the children could mention that its colour somewhat resembles copperas, but is brighter, and of different shades from dark to light; and that the vases, &c. made of the malachite were beautifully veined, like marble)—It is very hard; the articles which appear to be of solid malachite, are first formed of copper, and then covered with the malachite, after the manner of veneering—When the veining is small, and fully executed, their construction is difficult and expensive—Russian iron is superior in quality and well adapted for making steel; the supply of it is also very great, the mines in South Russia being so extensive—Those in the neighbourhood of Tula are covered only by a sandy deposit of a few inches in thickness. By considering what has been said, the children will see that both abundance and variety characterise the minerals of Russia.

II.—Lead the children by questions to tell whence the natural articles are procured, and how obtained; thus they would see that mining, in all its branches, forms an extensive and important source of occupation in Russia; (it was commenced there upwards of three centuries ago, and was much encouraged by Peter the Great.) They should then compare the iron and copper ore with the manufactured articles of iron and copper, and be led by questions to conceive what has been done to the rough ore, to fit it for use; and to mention that as heat is required in most of the operations upon metals, a plentiful supply of wood or charcoal is necessary. (Here refer to a map on which the

situations of the different coal and metal mines, and the woody districts, are marked; and the children will see that both wood and coal are plentiful in Russia, its forests being numerous and extensive, while large coal mines are found in some parts, as Siberia.)

Smelting, an art obtained by the Russians from the English in the sixteenth century, is extensively performed in Russia;—the children may remember seeing the name “Siberia” attached to the bars and sheets of iron in the Exhibition, and thence be led to infer that much of the smelting and working of iron is done there. The children to enumerate the advantages possessed by Russia for commerce in minerals; unlimited natural wealth, and an abundant supply of wood and coal, which are requisite to the manufacture of minerals; then they should be led by questions to state what is done with the articles when made—that they are conveyed from the manufactories to the cities and sea-port towns, and thence sent to all parts of the empire, and abroad. Show them from the map that Russia is very extensive, that her cities and settlements are scattered, and that consequently goods must travel far in being conveyed from place to place; let them mention the different means of conveyance, rivers, railroads, canals, and by vehicles along high-roads. They would see from the map that Russia possesses many large and noble rivers, which, as the country is generally flat, or gently sloping, have slow currents, and would therefore be well adapted for commerce, except, that as the greater part of Russia is in the colder regions of the earth, most of them are frozen during a great part of the year. Tell the children that in Russia roads are bad, and canals and railroads are few; then let them compare the commercial advantages which they before enumerated, with the disadvantages which have been just stated, and they will expect that Russia has but a small trade in proportion to her wealth, owing to the difficulties in communication and conveyance.

III.—Let the children state their opinion on the manufactured articles, as to their number, variety and workmanship, and compare them with those of other countries. They might mention that the inscription "Imperial Works" was placed upon many of the articles from Russia. Tell them that those articles were made at manufactories established by the Russian Government, which has four large establishments for the manufacture of iron,—Tula, where fire-arms are made, being the oldest. The work is performed by vassals of the Crown, who are under the superintendence of Government officers, and who receive the same amount of wages, whether the work is greater or less; for the Government of Russia is despotic. Let the children compare the state of workmen in Russia with that of workmen in England, and say how *they* should feel and act under each of the two conditions. In the former, feeling that all their extra labour would bring them no more than their allotted pittance, they would probably make more effort to get through their tasks than to perform them *well*; in the latter, they would feel an interest in their work, because the reward would be increased in proportion to their success, and they could employ their money and their leisure as they liked; they would also strive to excel each other, and to improve continually. The children then would see that the general inferiority of Russian manufactures, is partly caused by the system under which the workmen are employed. They might be led by questions to see that intelligence and experience are requisite to make a skilful workman; and then told that the Russians have long been an ignorant, and but half-civilized nation; their condition two centuries ago to be described; but that great efforts are being made for the improvement of works of art; to ask the children what would be the best means of obtaining knowledge, that such a nation could adopt, surrounded as it is by civilized countries. Then tell them that Schools of

Design are attached to several of the Crown manufactures, that pupils are sent abroad for education, and that foreigners from those countries where the fine arts are carried to the greatest perfection, are employed to superintend many of the establishments. Questions would lead the pupils to say, that of the various manufactures, the Russians show greatest proficiency in those bearing an ornamental character; perhaps because they have great intercourse with the French, who are celebrated for works of taste. A comparison of the present state of Russia with its condition 200 years ago, will show the rapid progress which its inhabitants have made, and lead the pupils to see that greater may yet be expected.

THREE SKETCHES OF LESSONS ON GLASS.

GIVEN TO A CLASS OF CHILDREN FROM EIGHT TO TWELVE YEARS OLD.

SKETCH I.

I. *Different kinds of Glass compared.*—Bring together several pieces of different kinds of glass, and ask the children to name each—as, crown-glass, plate-glass, sheet-glass, flint-glass, bottle-glass. These pieces should be examined by the children, that they may point out the difference. They should name the various uses to which they have seen glass applied, and the particular use of each kind; as, for windows, mirrors, drinking-glasses, decanters, ornaments, bottles, watch-glasses, &c.

Qualities of Glass.—The class should be called on to name the qualities in glass which render it useful; as transparency, hardness, durability, not being affected by weather or acids, &c.

Glass contrasted with substances used in former times.—Other substances possessing the same qualities, but in a less degree, should be shown the class, named,

and a contrast drawn, for the purpose, of proving the superiority of glass over these substances. Thus—horn has not the same degree of transparency; parchment is not so durable; talc does not admit the light so freely; and none of the three have the same bright, cheerful, beautiful appearance that glass has.

II. *Various substances used in the manufacture.*—The various substances used in the manufacture of glass should then be produced and named—as, sand, an alkali, as pearlash, nitre, oxide of lead, oxide of manganese, oxide of arsenic, lime, &c.; and the children should be led to see that each ingredient imparts a particular quality to glass. Pearlash, which is much used in flint-glass, imparts much clearness. Oxide of lead is used to cause it to vitrify at a much lower temperature than it otherwise would; to increase the density; and to impart tenacity.

III. *Origin and history of the manufacture.*—Information should be given to the children with respect to the progress of the manufacture, and of its supposed origin. They should be told, or should be allowed to read, of the Phœnician merchants, who, having lighted a fire on the sand, and having taken some fossil alkali (with which their ship was laden), on which to rest their cooking apparatus, found that the heat caused the substance to vitrify. They should be told a little of the glass-works of the Phœnicians and ancient Egyptians; the many fine specimens of glass in urns and vases which are seen even at the present day, and which show to what an extent the manufacture was carried. They should be told of the introduction of glass-making into Europe—first into Italy, finally into England; but that glass was used very much in England long before the art of making it was known; for even as far back as the time of the Druids, we find glass beads and amulets worn, which were procured in barter with Syrians, who came to the island for tin.

Recapitulation.—After receiving this information, which should be thoroughly worked into the children's minds as the teacher proceeds, they should reproduce the matter on their slates.

SKETCH II.

I. *Glass-house, and tools used.*—In this lesson the children should (after recapitulating the last lesson) give a description of any glass-house which they may have seen, and also of the different tools used by those who work in glass. If they have not seen one, a small model or picture may be shown, representing the different parts. They should describe the conical-shaped building—The furnace in the centre, with the working-holes at the sides—The pots, which are made of the finest clay—their position and number—The tools used by the glass-blower, as iron-tube, shears, punting-rod, tongs, &c. They should then be asked as to how the men on the premises are generally employed: some in glass-blowing; others in attending to the furnace, carrying coals; and others watching the pots, &c.

II. *Processes gone through in the manufacture of Glass.*—The children, having noticed how the workmen were employed, will be prepared to learn the different processes gone through in the manufacture of glass. As a difference exists in the making of each kind, the children may be led to speak of crown-glass only, as they are better acquainted with that than with the others, and more frequently see how that particular kind is used. They should first be told that crown-glass is that which is generally used for window-panes; and should say what qualities window-glass requires that are not of so much importance in other kinds; as hardness, transparency, and durability; and they should then be led to see that in order to give the glass these qualities, a slight difference must be made both in the quality

and quantity of the ingredients used. The children should be told that such substances as lead, or metallic oxides, make glass soft and plastic; and they will at once see that very little of these must be used in making crown-glass, in which greater hardness is requisite. They should be told of the different processes gone through—First, the preparation of the sand by water, and afterwards by fire, for the purpose of removing any impurities—Next, the making of frit, and what frit is—The process of melting it down after having kept it for some time. The metal in a liquid state should be spoken of—The time allowed to pass before skimming the metal. The children should be asked if they had seen persons going about to buy up all the broken glass: and they should be told that such broken glass is very useful at this stage of the manufacture—The glass now used is known by the name of cullet, and is thrown in with the boiling metal. They should be told next of the workman—The tube which he uses—His mode of forming the mass of metal—1st, to a pear-shape—then to a flat surface. A description should be given of the process of annealing—What is its object—Why it is necessary—What qualities it will impart to the glass.

This lesson should be reproduced in writing.

SKETCH III.

I. *On Stained Glass.*—Several pieces of glass of different colours should be brought before the children. They should examine and describe them, and ascertain whether the colours are merely external, or whether they are such as cannot be removed without destroying the glass. They should be asked where they had seen glass of different colours?—If they had seen figures represented on glass by means of colours—and where? Ask those who had been to the Exhibition to describe the coloured glass which

they saw, and the figures represented, as well as the colours in which the figures were done. They should be led to name the kind of buildings in which coloured glass is generally seen ; such as churches, or ecclesiastical edifices of any kind ; particularly in those where the object is to make an imposing appearance. Many Roman Catholic churches and cathedrals have very fine windows of stained glass.

II. The teacher under this head will describe the process of glass-staining, dwelling on the following points:—The pattern, or drawing of the figures to be represented, which is first made—The mode of placing this behind the glass for the purpose of painting the pattern, the materials being prepared beforehand. A description should be given of the muffle, or iron box, in which the glass is burned. The care necessary on the part of the glass-stainers should be noticed—The fusing of the glass and its absorption of colouring—The time allowed in the furnace—The removal of the loose particles of paint. The class should be told that the colour is produced by fusing gold, silver, and copper with the glass : and that gold is used in producing rose colour and ruby ; copper in producing blue, green, and lemon ; and silver and lead in producing yellow and orange ; they will easily see what colours in glass bring most money—which are most expensive.

III. The children should then be told of those buildings in England where there are stained-glass windows. The windows in King's College Chapel, in Cambridge, and an old window of stained glass in York Cathedral, should be named ; as well as any others which may be known to the teacher.

SKETCHES OF A SERIES OF LESSONS ON SILK AND ITS
MANUFACTURE.

FOR AN ADVANCED CLASS OF CHILDREN.

LESSON I.—INTRODUCTION, AND NATURAL HISTORY OF THE SILK-WORM.

I. *Object examined.*—A piece of silk is given to the children, which they carefully examine, and are then called upon to describe its *appearance*; as, smooth, soft, glossy—Next, they discover and name the *qualities* upon which its use and beauty depend, viz.—Its strength, which is great, considering the fineness of the fibres of which it is composed—Its lightness—Lustre—Capability of taking the finest dyes—It resists fire better than cotton fabrics do—Is beautifully soft to the touch, and extremely pliable, so that it can be arranged in folds.

[*Note.*—Specimens of the insect in all its stages will be shown to the children, and constantly referred to in the course of the lesson.]

II. *Description of the silk-worm.*—Insect and its habits described—Show the children that the silk-worm is erroneously termed a worm—Why?—It is really a kind of caterpillar, and passes through all the changes which insects undergo.

Changes which the insect undergoes.—Many of the children have perhaps tried to rear a silk-worm, and will therefore know that it is hatched from an egg, in size like a mustard seed; and is, when first hatched, small and of a dark colour: in a few days it becomes grey, then tinged with the colour of its food; it attains its full size in about eight weeks, and it has during this period changed its skin four or five times—Children to determine why this is necessary—Its continually increasing size—The insect remains in a quiet state before doing this; refrains from eating; then bursts the old skin near the head, and works its way out.

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Length, when full grown, from two and a-half to three inches—What does it then do?—Begins to spin—Tell the children that it selects a corner in which to spin, then moves its head from side to side, and fixes the thread at different points, so as completely to enclose itself—Continues to spin for about five days—During this time it has become much shorter—Changes its skin, and takes the form of a chrysalis enclosed in a dark brown case, and is in a torpid state—Remains in this state two or three weeks—Then changes into the moth, or perfect insect—The children will perhaps wonder how the moth can escape from the cocoon in which it is so completely enclosed—Tell them that the little creature does this by softening a portion of the cocoon with a fluid which it has the power of forming—It is now, as they will see from the specimen, a moth of a pale cream colour, covered with fine down, and furnished with small comb-like feelers—After a short time it lays its eggs, firmly cementing them to the substance on which they are deposited; and the object of its existence being thus accomplished, it shortly dies—Children to draw a comparison between the animal in its different stages, as to appearance, organs, and habits.

III. *Food.*—On what does the silk-worm feed?—The leaves of the mulberry tree—Children will know that as this tree is not an evergreen, the leaves can only be procured at certain seasons of the year—Has this anything to do with the hatching of the eggs?—Yes; they must only be hatched in those seasons when the leaves can be obtained.

Means used to prevent the eggs from hatching at a wrong season.—Sometimes the eggs are sent from one country to another—How are they prevented from hatching on the journey?—They are first carefully dried; placed in glass phials, closely sealed, to exclude the air and moisture, and then immersed in earthen pots filled with cold water, which is constantly changed—Why?—To keep it cool—Why should so much

pains be taken to exclude the air from the egg, and to prevent their becoming warm?—Because the eggs of the silk-worm, like those of the chicken and other animals with which the children are acquainted, are hatched by heat.

Manner of hatching the eggs.—The children might then be told the different means used to hatch the eggs—That in some districts the peasants fold them in small paper packets, and keep them in their bosoms until the warmth prepares them for hatching; in others, that the warmth of the sun is employed; but that the plan most generally adopted is to hatch them by placing them in rooms artificially heated.

IV. *Countries of the Silk-worm.*—A warm climate is necessary to the well-being of the silk-worm—Children name and point out on the map some warm countries, as—France, Italy, India, China, &c. They might then be told that the silk-worm is reared in nearly all the southern countries in Europe; to a very great extent in India and China—That it was originally a native of China, from whence articles manufactured of silk were exported in early ages to different parts of Asia and Europe, and that the raw material furnished employment to manufacturers in Persia, Tyre, and other countries.

How introduced into Europe.—The silk-worm was introduced into Europe A.D. 552, by two Persian monks, who were missionaries, and had travelled as far as China, where they viewed with great curiosity the dress of the Chinese, and carefully watched the manufacture. On leaving China they went to Constantinople, and entrusted the emperor Justinian with their secret; he encouraged them by promising them a reward if they succeeded in introducing the manufacture into Europe. They returned to China; with much difficulty obtained a quantity of eggs, cunningly concealed them in a hollow cane, brought them to Constantinople, hatched them, tended the insects with great care, and instructed the Romans

in the art of manufacturing silk. The children will thus see that the silk manufacture in Europe had a very small beginning—a careful of eggs being the means of establishing the manufacture, and of furnishing the Europeans with a luxury, for which large sums had hitherto been exacted from them by their Oriental neighbours.

This and the following lessons should be reproduced by the children in writing.

LESSON II.—BRIEF DESCRIPTION OF THE SILK MANUFACTURE.

I. *Different processes in the manufacture.*—How is the silk obtained from the cocoon?—What is the first process in the manufacture?—The destruction of the chrysalis—How is this accomplished?—By placing it in a heated oven—What is next done?—The rough, outer floss, which is comparatively useless, is removed, and the cocoons are thrown into a vessel of hot water placed over a fire—Why?—To loosen the thread—The whole is now stirred with a bunch of twigs which catch the loose ends of the threads—Several of these threads taken together are wound upon a reel—Why take several together?—Because the fibres are so fine that one taken alone would not be strong enough, it would quickly break. The silk wound off is next tied up into hanks ready for the manufacturer, and is known by the name of “*raw silk*.”

[*Note.*—Drawings or models of the machines used in the different stages of the manufacture should be placed before the children, and constantly referred to by the teacher whilst describing the various processes.]

II. *Various operations which the raw silk undergoes.*—Briefly describe the various processes which the raw silk passes through, as winding, spinning, twisting, cleaning, weaving, and dyeing; all of which, except the last, are known under the general term “*silk throwing*.”

Winding.—In this operation each hank of silk is

extended upon a six-sided reel (*swift*)—A number of swifts are arranged side by side, upon an axis, on either side of a frame—Above the swifts are the bobbins, similarly arranged, one bobbin for each swift. The bobbins connected with the swifts by the ends of the hanks of silk are now set in motion, causing the swifts to turn round and wind the silk—The machine requires constant attention—Why?—For the purpose of joining the ends broken in winding, putting on the hanks, and exchanging the bobbins.

Spinning.—The silk is now sorted according to its qualities and fineness. The next process is that of spinning or twisting each thread, which is done in a mill, where it acquires that form called "*singles*"—How is this effected?—The long thread of silk is unwound from the bobbins on to a long roller, and in its passage from one to the other becomes twisted—How can this be?—The bobbins are fixed upright, and the roller is placed horizontally above them; this circumstance alone is sufficient to twist the silk while passing from one to the other. (The children may try this for themselves, by fixing a reel of silk upright upon a table, and winding the thread from it on a horizontal stick, when they will find that the thread receives a slight additional twist by the contrariety of motion.) Two or more of these singles are now twisted slightly together in the manner above described; the next operation is to spin these combined threads into a firm thick thread, which is performed in the same manner as the former spinning.

Cleaning.—One process only remains before the silk is fit for the weaver, viz. the cleaning—How is this performed?—The silk is boiled for four hours in a large quantity of water, into which a good deal of soap has been thrown—Why does the silk require cleaning?—Because it still retains the gum with which the insect covers it, which if not removed renders the silk harsh to the touch, and unfit to receive the dye—By cleaning, however, the silk be-

comes soft and glossy—It is now sent to the loom, where it is woven into various fabrics. (Drawings of the shuttle, power-loom, and also of a piece of silk in process of weaving, will here be shown to the children.) They will easily see that weaving is merely an “*interlacing of threads*,” crossing one another, so that those which proceed in one direction help to fix those in the other. In a long piece of woven silk the long threads are called the “*warp*,” and the cross threads the “*weft*,” or “*woof*.” These words, and any others *new* to the children, which may occur in the lesson, should be written upon the slate, and the heads of the lesson also, as it greatly assists the children in afterwards reproducing it on their own slates. Before concluding the subject of *weaving*, the teacher might show the children the great care and patience necessary on the part of the weaver, in consequence of the fineness of his work; a piece of silk 20 inches in width, often requiring 8,000 threads, all of which must be arranged with the greatest regularity.

Dyeing.—Can the children think of any process which the silk has yet to undergo before it is fit for sale?—Of what colour is it now?—Did the cleaning alter the colour?—No; it is still of a bright yellow colour—But white silk is sometimes wanted—How is this obtained?—The silk must be “*bleached*,” made white, and then it is fit also for the dyer, who, by means of his colours, can make the silk of any shade which he pleases.

LESSON III.—BRIEF DESCRIPTION OF THE VARIOUS FABRICS COMPOSED OF SILK.

[*Note*.—The required specimens should be procured, and shown to the children.]

I. *Articles made of silk named*.—Children furnish the list—Velvet—Silks, plain and brocaded—Persian—Damask—Ribbon—Satin, Sarsnet, and Crape. The value of silk inferred from the number of articles

manufactured from it, and the great difference in their texture.

II. *Description of the Fabrics. Velvet.*—One of the most beautiful productions of the silk-loom now manufactured. In addition to the warp and woof, a soft shag or pile is produced by inserting short pieces of silk-thread, doubled, under the woof; these stand up in so large a number and so compactly as to conceal the interlacings of the warp and woof. The children will see from examining a piece of velvet, that it is this silky pile which imparts to velvet its softness and beauty.

Brocade.—Brocaded silks are those adorned with flowers or other figures of silk.

Gauze.—A material in which the smallest quantity of silk is employed for a given size of woven fabric—How can this be done?—If the gauze were woven in the usual way, the threads being so fine it would be very weak—How is this prevented?—The threads are made to cross and overloop each other, (something like the threads of a net,) and thus the material acquires the requisite strength. The children to discover this intertwining of the threads by carefully examining a piece of gauze.

Bombazine, Poplin, and Lustre.—Examined, and found to be substances composed of a mixture of silk and worsted, the two latter containing much more silk than the former.

Satin.—A twilled silk, owing its peculiar lustre to the number of threads of warp passed *over* by the weft before it passes *under* one of them—When taken out of the loom, it presents a slight degree of roughness or flossiness—How is this removed?—The children can all tell how their pinafores look after they have been washed and dried—Are they fit to wear?—No; they look rough—How do they feel?—Very stiff and uncomfortable—How can this roughness be removed?—They must be ironed or mangled to make them smooth—Then how do they think satin can be

made so nice and smooth?—Just in the same manner; it is passed between heated iron rollers, which smooth down the surface, and give to it that beautiful lustre peculiar to satin.

[*Note*.—A Map of the British Isles should be placed before the children, and they should be required to point out the seats of the manufacture as they are mentioned.]

III. *Towns in which the Manufacture is carried on in Great Britain*.—Show the children that broad silks, including all manufactured goods of entire silk, sold by the yard, as—gauze, persian, satin, crape, velvet, damask, silks, both plain and figured, are manufactured at Macclesfield, Spitalfields, Manchester, Glasgow, and Dublin.

Ribbons.—Manufactured chiefly at Coventry; also at Congleton, Macclesfield, Derby, and Spitalfields.

Handkerchiefs.—Made at Paisley, Manchester, Macclesfield, and Glasgow.

Crape.—Manufactured in Norfolk, Suffolk, Essex, and Somersetshire.

Silk Stockings and Gloves.—Extensively manufactured at Nottingham.

Mixed Goods.—Chiefly at Norwich; but Ireland is peculiarly famous for poplins.

Poplins.—At Manchester and Derby.

Shawls.—At Paisley, Norwich, and Edinburgh.

The children will see from the number of towns mentioned, that the silk manufacture is very extensively distributed over Great Britain.

The raw silk is imported by the British from China, Italy, France, and the East Indies. Articles manufactured of silk are exported chiefly to the United States and British America.

THE MEDIÆVAL COURT.

A LESSON INTENDED FOR PUPIL TEACHERS WHO ARE SUPPOSED TO HAVE SEEN IT.

I. *The Title.*—Origin of the name Mediæval—Period to which it refers—its commencement and close.

II. *Objects contained in it.*—Students having observed, describe the altar—Its shape—Size—Raised and carpeted—Covered with a white cloth worked with the needle—Sustaining a crucifix, with chalices on either side, and the paten in front—Large wax tapers in silver stands—Table, cabinet, screen, side-board, described in the same way—Determined to be Mediæval in style and material.

III. *Workmanship.*—Attention directed to the carving of chairs and cabinets—The embroidery of altar-covers—the inlaying of a table with various coloured woods in small and tasteful patterns—All very elaborate—These articles probably made in a short time by the modern plan of division of labour, and use of machinery—Work done on other principles and by another method in mediæval days—Formerly a piece of furniture cost some member of the “Carver’s Guild” and his apprentices the work of years—The tapestry worked at, day after day, by some matron of high or lower degree, was, after her life, completed by her daughters—Reference first, to state of trade at that period—Small profits and quick returns could not have been the tradesman’s system—How this affected the mass of the people—Secondly, to the state of domestic society—The workers of tapestry hanging must have obtained leisure for their work, from living in a condition of household seclusion not now known—Advan-

tages and disadvantages of change of manners in this respect.

IV. *Size and Massiveness*.—Specimen, the enormous side-board ornamented with gold and silver dishes proportionably large—A Mediæval chair—What thick planks and bars enter into its construction—Inferred that the furniture was designed to last as long as the habitation—Sort of habitation inferred from the furniture—Must have been that of the noble and wealthy—Why?—Too high, wide, and weighty for the low roof and weak walls of the peasant's hut,—How this was furnished—Bed of rushes—Some wooden bowls, with perhaps spoons to match—also a wooden stool and roughly hewn chest or table—No specimens of these—Why?—Universal goodness of God shown in the progressive multiplication of the comforts of the poor, for they are the many of the earth.

V. *The materials*.—Oak, walnut, beech, compared with woods now used, viz. deal, mahogany, rosewood—Why none of these were used—Then no ships came from the West, few from the East, and fewer from the North—Reference to commerce of this period—Navigation difficult and dangerous—Ships ill constructed—Inferred that the cargoes would be such as to include the most value in the least space—Jewels—The precious metals—Rich stuffs—Valuable drugs—Wines and spices—To what these contributed—Rather to the luxury of the rich, than to the increase of national comfort—Purposes of God bearing on the social, mental, and spiritual improvement of the human family, worked out by extended commerce.

VI. *General appearance*.—Splendour and richness of ornament—Specimen—Crucifix and chalices chased and jewelled—Priestly vestments of silken fabric, and gorgeously embroidered—Character of these objects—Ecclesiastical—Whatever is rarest, most splendid in effect and elaborate in execution, found in church ornament of this period.

VII. *Tendency to excessive Church ornament in the present day.*—Cause—Extreme love and veneration for all that is ancient, and delight in what speaks to the imagination—Reasons why better suited to the Roman Catholic ritual, than to our own.—The former, addressed to the senses—Calling largely on the imagination—Using emblems and shadows as helps to devotion—The latter appealing chiefly to the heart—Presenting what will lead to a walk of faith, not sight—Requiring, indeed, that the externals of religion should be conducted with decency and order, but holding that the main point is to worship God in “spirit and in truth,” considering that we are not under a dispensation of types and shadows, but the dispensation of the Spirit, the types and shadows being fulfilled, and a clearer light shining on the Church.

To do justice to this subject, it should occupy at least two lessons.

NOTES OF A LESSON ON A KNIFE AND FORK.

FOR CHILDREN BETWEEN SEVEN AND NINE YEARS OF AGE.

I. *Objects observed and compared.*—1. *Resemblance.*—Traced by the children—As to use—Both used in taking food—Substance—Partly mineral and partly animal—Make—Both have handles, shanks, and points.

2. *Difference.*—In use—One to cut up the food, the other to keep it firm and convey it to the mouth—In make—The one has a blade, the other a shank spreading out into three prongs—Why this difference?

II. *Adaptation of make to use.*—Children to determine this—Handles and shanks to both—Why?—The blade of the knife—Why thin at one edge?—Why blunt at back? To allow the pressure of the

finger in cutting; also to strengthen the blade—The fork—Its shank—Why longer than in the knife?—Why partly visible, and not, as in the knife, hidden by the handle?—Its use—Prongs—Their number, and the reason for this number—Why narrowing towards the points?—Why edged and not quite cylindrical?—To give them a firmer hold in the meat—Use of the shoulder.

III. *Adaptation of material to make.*—Children to discover this by comparing it with various other substances.

1. *The blade of the knife.*—Why not of stone?—A stone blade could not give way when, being used, it might happen to come in contact with any other substance, as gristle, &c.—Blade not flexible—Why not of lead?—A leaden blade would bend, lose its shape, and become useless—Not elastic—Why not of tortoise-shell?—A tortoise-shell blade as likely to break as to yield—Why not of wood?—A blade made of wood, or of any of the other substances, would not take an edge sufficiently fine and sharp. The last two substances not sufficiently hard or tenacious.

Requisites for the blade of a knife determined by the children—Flexibility, elasticity, tenacity, hardness—Why not of iron, which possesses all these qualities?—The blade must be very smooth, and capable of taking a high polish, not to disfigure the joint, and to cut thin, smooth slices.

Substance possessing all these requisites—Steel.

2. *The metallic part of the fork.*—Qualities required—Tenacity—Hardness—Capability of taking polish—Steel required for this also.

3. *Handles.*—Must be light—Why?—The metal is heavy—Smooth—Why?—That the touch may be pleasant to the hand, and that they may be easily cleaned—On these accounts commonly made of bone—The more expensive ones of ivory.

IV. *Summary.*—The children required to repr-

duce this—First from the large slate, on which every point as worked out was noted down, and afterwards either orally, with the aid of the teacher, or by themselves, on their slates, if they can write.

SKETCH OF A LESSON UPON THE PICTURE ENTITLED,
"YOUTHFUL ART STUDYING THE LINEAMENTS OF
HER GREEK PARENT."

LESSON TAKEN FOR STUDENTS, FROM THE PICTURE IN THE FINE ART
COURT OF THE EXHIBITION.

I. EXAMINATION of the picture shows that the youthful Art is English-born—How discernible?—In cast of features—In fair, yet ruddy complexion—blue eye—chestnut hair—crowned with a wreath—Why?—Because invested with power over inanimate matter, to educe from it forms of human beauty—Holds the implements of her labour (tools of the sculptor), but is contemplating the features of the parent she desires her work to resemble in a marble figure—This bust is Grecian—The shape and proportion, the drapery and helmet, Grecian—The features evidently taken from a dead, not a living model—What this represents.

II. Causes of the development of artistic skill in the ancient Greeks.

1st. Position and natural features of their country—Its maritime situation—Proximity to a grand mountain range—Varied surface—Fertility—What this did for the people—Rendered them familiar with all shapes, hues, and sounds of natural beauty—Seeing the beautiful everywhere they wrought it out of everything; becoming equally eminent for music, painting, sculpture, and poetry—What specimens preserved to us—Some of the two last only—Why?—Class led to compare Judea with Greece as to physical features—Points of resemblance dis-

covered—The same causes should produce the same effects—Class led to compare Jews and Greeks as to progress in arts, principally by referring to the Sacred Record—The Jew as good a musician—a far better poet—Why?—Without reference to inspiration, he had an infinitely nobler theme—Why he cannot be made the subject of comparison, as sculptor and painter—Because, from his interpretation of the Second Commandment, he almost forbade himself the exercise of these arts.

2d. *Dress and customs.*—National garb loose, light, not full—How this bore on art—Leaving the figure partially uncovered, and every movement of muscle accompanying the different gestures distinctly noticeable—National sports—Wrestling—Racing—What these did for art—Exhibited the combatant in every variety of position—Class led to compare these with Hebrew dress and customs—Jews had no such amusements, and the flowing folds of their long and full garments disclosed only the outline of the figure—Ample compensation for this artistic disadvantage found in the purer morality of the Jewish nation—When this morality deteriorated—Often as the Israelites came in contact with Greek neighbours—Historical evidence of this—Importance of moral over intellectual development.

3d. *Religious ideas.*—How the gods and goddesses of Greece are represented—As human, though not as mortal beings—and though immortal, not eternal, for they had a beginning, and it was believed that they would come to an end—Endowed with lengthened existence, and the power of sustaining it under conditions impossible to humanity, but of like passions with their worshippers—How proved from accounts of them—Liable to gross error both in conduct and judgment—Outwitted at times by men—Having peculiar preferences for peculiar objects and localities—Refer to Greek mythology—With this religion, and this artistic skill, what would

the Greeks do?—How natural for them to multiply representations of such deities as these—Compare these ideas with the conception of inspiration, and think, with the Israelite of old, of the High and Holy One Who inhabiteth eternity, Who is from everlasting to everlasting.—When the Gentile once realized His presence, when the spirit of which Eliphaz could not discern the form passed before him, and fear came upon him and trembling, did he afterwards think of embodying the idea which impressed him in marble or metal?—What wonder that the profanation of art in the Gentile world caused the devout Jew to hold art itself in abhorrence.

III. *Conclusion.*—The real glory of art—Its office—Not merely to gratify our æsthetic perceptions or conceptions—Though this were something, for in giving us this sense of beauty, God has provided for its gratification—Reference to flowers, shells, &c.—But to form a fit record of all heroic and beneficent actions, whether individual or national—In embodying the forms of the past, it were to be desired that art would consecrate her efforts more to scriptural, less to mythological subjects; more to those of an historical and moral character, than to those drawn from the regions of fancy, and often administering to man's worst passions. Even in this day, if she awaken to nobler designs than those for which her parent existed, she will be capable of nobler execution than Greek art can show.

MORAL INSTRUCTION.

THE REWARD OF INDUSTRY.

A LESSON INTENDED FOR THE LOWEST CLASS OF CHILDREN.

Suppose the children to have visited the Crystal Palace, and to have read on the pedestal of a statue the inscription, "Alfred receiving from his Mother the Book of Saxon Poetry," and on the following day to beg of their teacher the historical explanation. Their request might be granted, with a view to stimulate them to industrious perseverance, by the example of Alfred, and the reward he gained.

I. *Children describe the Statue.*—A lady and a youth, the latter seemingly older than any one of themselves, of a tall and graceful form, with a countenance expressive of earnestness, satisfaction, and delight; holding open in his hands a manuscript. The female with her left arm round the neck of the child, and her right hand upon the book, evidently either commending or exhorting him, and sharing in his happiness.

II. *Teacher narrates the story.*—The youth represented is Alfred, (heard of by the children as "Alfred the Great.") He was the son of a king; and was born rather more than a thousand years since, in that part of England now called Berkshire. (County pointed out in the map by the children.) England was then very unlike what it is now. Had there been at that time an "Exhibition of the Works of Industry of all Nations," Alfred's countrymen could have supplied very few specimens, for their time was spent chiefly in hunting and fighting. From morning to evening, day after day, weapons occupied the hands of the men. Let the pupils themselves infer from these facts the state of

learning and the character of the people. Ignorance so prevailed that Alfred, when arrived at the age of twelve years, though a king's son, and a very intelligent boy, possessed of much valuable information, the gleanings of his own careful observation when travelling in other countries, did not know the alphabet of his own language. Alfred had, however, a wise and pious mother, (Question asked, "What would such a parent desire for her children?") who knew his passion for that kind of poetry which recorded the heroic and brilliant deeds of some of the heroes and most distinguished persons of his native land. Upon one occasion, when surrounded by her four sons, she read from a book of Saxon poetry, *poems* much to the taste of the boys, who expressed their delight. The precious manuscript, in addition to its entertaining histories, was gilded or illuminated by ornamental letters or beautiful pictures. Each boy viewed it with a longing desire to become its possessor. "I will give it," said their mother, "to him among you who shall first learn to read it." (The children led to the conclusion that, from the absence of learned men, and the time required to produce a manuscript, necessarily *written by the hand*, a book in those days was invaluable.) Alfred, the youngest of them all, ran immediately to a teacher, begged to be taught to read, commenced the task with great industry, and soon won the prize with which his mother is represented as presenting him.

III. *Application*.—Direct the children's attention to the length of time which it has taken them, with greater facilities, to learn to read. Let them account for Alfred's success. He was industrious, and possessed a thirst for knowledge. By recalling instances in which they have evinced industry, and been rewarded, perhaps only by their teacher's or parents' approbation, a game of play, a favourite lesson, or something very trifling; and contrasting these with

pleasures *not* the result of their own exertions, lead them to the perception of the fact, that the fruits of our own industry bring with them a satisfaction far superior to the feeling of gratification accompanying that which comes to us without labour. Does not this explain Alfred's look of satisfaction as he gazes upon the Saxon manuscript? Excite the children by dwelling on the subject to appreciate the industry and the success of the youthful Alfred, and stimulate them to make similar exertions.

SKETCH OF A LESSON ON THE SHIPWRECKED
SAILOR-BOY.

TO BE GIVEN TO THE YOUNGEST CHILDREN.

I. *The Statue examined and described by the children.*
—The teacher merely guides their attention, and supplies their deficiency of language. A boy lying stretched on a rock—His clothes clinging to him—Why?—Because they are wet—He is bare-footed—Has on no coat—Has lost his hat—His hair dishevelled and dripping with water—His face is pale, and ghastly—He is holding in his hand a small picture, which is fastened round his neck—It is a picture of his mother, and he is looking intently on it—His mouth is open—He is saying something—Learn from the inscription below, "Almighty Father! oh protect my widowed mother!"—Poor boy, who and what is he?—How has he come there?—Look a little further; what is lying beside him?—A piece of broken mast, with a rope tied to it—What does this tell us?—He is a sailor-boy—he has been shipwrecked—And been cast away on that rock—He is dying—His thoughts are about home and his mother—He prays to God for her.

II. Having thus excited the interest and curiosity of the children, help them to make out what might

be supposed to be the history of the lad. But first get from them the different motives inducing boys to become sailors: Some, because they are dissatisfied with home—Others, because it is their parents' wish—Others, from a love of seeing new things—Others, because they think they shall have more liberty—Others, from a love of enterprise and independence natural to English boys—Others, to succour an aged or bereaved parent—Which may we suppose to be the case here? What does the lad's prayer tell us? That his mother was a widow, perhaps unable to work for herself, and nothing to depend on for a livelihood but the efforts of her son—What leads him at this moment to look so earnestly to God to protect her?—The son who had been her only human support was about to perish—What may we conclude, then, induced such a son to choose a sailor's life?—He very likely embraced a seafaring life, which may have suited his own taste, that he might be able to gain a subsistence for his mother. We may fancy that he went voyages to different parts of the world; perhaps to Australia, with emigrants—To Canada, for wood and furs—To India or China, carrying out missionaries for the spread of the Gospel, &c. &c.—Returning after each voyage to his mother, taking her the money which he had earned, and cheering her home and her heart with his presence. It was, we may suppose, after one of these voyages that he embarked again; perhaps, going to the West Indies for sugar. Let us trace the ship as it sails along: (the scene pictured out)—A clear blue sky, bounding the sea on all sides in the form of a vast arch or canopy, with here and there a fleecy cloud, and in the midst the glorious sun shining in full noontide splendour, then sinking below the horizon, and gilding with its beams the vast expanse of ocean.—A gentle breeze rippling the surface of the water, which appears to glisten and dance in the sunshine—In the midst of the waters, moving majestically, like

a thing of life, the noble vessel, every sail unfurled to catch the stirring breeze—What a beautiful sight!—Does this recal any of your school pieces?—Yes, “The Ship”—Repeat the first two verses:—

“Yon stately ship so firmly built,
See how she cuts the main;
The wind is fair, she leaves our sight—
Will she return again?”

“She may; but should those limpid waves,
Which gently kiss the shore,
In wild commotion heave and rage,
She may return no more.”

The passengers on board enjoyed the scene, appearing pleased and happy. They probably sailed for days and for weeks, and all went on well, the sailor-boy doing his duty faithfully and often remembering his loved mother. But suddenly the sky, lately so bright, became overhung with clouds, which every moment became darker and more threatening; the wind swept by the vessel with a low moaning sound, threatening the coming storm, and gradually increased to a sullen roar. This was intermingled with the shrieks of the affrighted sea-bird; flashes of lightning shot across the scene; thunder was heard in the distance; the waves rose higher and higher, as if about to overwhelm the vessel, which, with sails furled and timbers creaking, still held up gallantly against the storm. Gradually the waves rose mountain high; the ship tossed on the waters, was now elevated on the tops of huge billows, now almost engulfed beneath the waves which dashed over it, threatening every instant to sweep off its deck those who so lately were smiling and happy, and who now tremblingly await the fate which seems inevitable; some clinging to dearly loved relatives, fearing that every succeeding wave will part them, as to this world, for ever; many of the sailors uttering awful curses, others wild prayers; whilst a few await, with calm prayerful submission to God, their destruction.

At last the ship, meeting with one of the fearful reefs so common near the West Indies, was dashed to pieces on the rocks, and most of the passengers and crew find a watery grave. The sailor-boy appears to have clung to a piece of the wreck, and after being tossed about at the mercy of the waves, perhaps for days, was at last thrown almost lifeless on a rock—there to die. What must then have been his feelings? Far from home, far from all that were dear to him, far from his mother whom he loved so much, left to die there alone. But was he fearing for himself? How does the statue represent him? Contemplating in his dying moments his mother's picture. Read what he is saying,—“Almighty Father! oh protect my widowed mother!”—What does all this show?—Yes, his filial affection! He remembered his mother's tender love and kindness to him when young; and when he could no longer work for her, committed her in prayer to Almighty God.

Who amongst you would live, work, and even go to foreign lands for the sake of your mother?—Which of you, after doing all you could whilst living, would pray for her when dying? Remember the sailor-boy; and feel as he felt for his mother.

PART II.

DOMESTIC ECONOMY.

VARIOUS MODES OF COOKING MEAT.

In the Great Exhibition there were some excellent kitchen ranges. These being so necessary in cooking, the thought was suggested that a few hints on the various modes in which meat may be prepared, would be useful to any inexperienced person who is about to undertake a situation as cook.

MEAT may be prepared in various ways.

I. *Roasting*.—

1. *Preparation of meat before roasting*.—All meat, especially beef and mutton, should be hung up some time before roasting; this makes it more tender than it would be if cooked when first bought. The time for hanging it up must be regulated by the state of the weather and the season of the year: in winter, when the air is cold, fresh, and clear, it will be better for hanging a week or ten days: in the summer, not more than two or three days; if hung too long in hot weather, it would decompose, and in cold it would be apt to lose the flavour and juice. Before the meat is put down to the fire the joints should be nicked, or partly divided, (especially of ribs and necks,) with a chopper, so that they may be easily separated when brought to table. Large joints of beef, mutton, and veal, should have a piece of writing paper placed over the fat, to prevent it from being scorched. Some

people put salt over the meat before roasting, but this is not a good plan, as it draws out the gravy.

2. *Preparation of the fire.*—The fire for roasting should be prepared at least half an hour before the meat is put down: it should be made in proportion to the size of the joint; if this be a small one, a small but brisk fire is required; if a large joint, the fire must be proportionably large. Care must be taken to keep the fire clear at the bottom, to prevent the ashes from falling into the pan, and giving the fat an unpleasant flavour, and also in order that the part of the meat at the bottom may be done through.

3. *Apparatus for roasting.*—For small families, when only small joints are required, a *bottle-jack* is the best for roasting, but a thick piece of worsted or string will serve the purpose almost as well. But there is danger in this, lest it should stop, and the meat burn in consequence; to prevent this it must be watched and twisted when there is any appearance of its being about to stop. The spit must be carefully wiped before it is put into the meat, or it will leave a black stain; it should never be run through the prime parts of the meat, or it will injure them by causing the gravy to run out. There were some newly-invented roasting-jacks at the Great Exhibition, and they appeared, as far as one can decide by observation, useful, and complete in their construction. The dripping-pan of one of these, which is made of tin, is connected to the jack by means of short pieces of iron; this connexion causes the pan to turn round with the meat, and prevents the cinders from falling in. Over the top of the jack is a cover, which is also made of tin; this keeps the meat free from dirt and dust, and not only so, but also reflects the heat down upon it, so as to economize fuel.

4. *Time required for roasting.*—About a quarter of an hour to a pound of meat is the usual time; if the joint be thick, rather more must be allowed. Allowance must also be made for the strength of the fire;

if it be very brisk, a quarter of an hour will be sufficient time; if a small fire is used, twenty minutes. Beef and mutton are much better under-done than over-done, unless preferred otherwise; but pork, veal and lamb should be well done, or they are unwholesome and indigestible. When the meat is first put down it should be placed at some distance from the fire, and gradually brought nearer, or else the outside will be burnt before the inside is warm through.

5. *Points of attention while the meat is roasting.*—Meat while roasting requires a great deal of basting; a good method is to put a little salt and water in the pan, and baste with it a short time before using the fat from the meat; this makes it brown and crisp. As soon as the meat is done, (which may be known by puffs of steam or smoke issuing from it, and drawing towards the fire,) the paper should be taken from the fat, and a little flour sprinkled over it; a little salt thrown over it will improve the flavour, and make the gravy flow when the meat is cut.

II. *Boiling*.—

1. *Rules to be observed in boiling.*—In boiling a joint of meat the saucepan must be perfectly clean, and of a convenient size to hold the joint; care must be taken that every part of the meat is covered with water, as the parts left uncovered will be discoloured, hard, and tasteless; as a general rule, a quart of water should be allowed to every pound of meat. All meat should be put into *luke-warm* water, and allowed to stand on the fire some time before it boils. For instance, a joint of ten pounds should be kept on the fire at least forty minutes before it boils, it should then be kept *slowly* boiling all the time, and not allowed to stop; if the water boils away it must be supplied with boiling water.

2. *Time required for boiling joints.*—As a general rule, twenty minutes should be allowed for every pound of meat; salt meat requires rather more; pork and lamb require twenty minutes over the whole time.

The lid of the saucepan must be kept shut all the time, except when it is raised just a little to remove the scum, which if allowed to boil down will make the meat look black. The meat may be improved by boiling it in a floured cloth, which makes it look white. No vegetables should be boiled with meat, except carrots and parsnips with beef, and turnips with mutton; cabbages or other greens give the meat a disagreeable flavour.

III. *Baking*.—Baking has its advantages and also its defects. It is considered that there is less waste in this mode of cooking; for this reason,—the meat being confined in the oven, the particles which escape in roasting and boiling are prevented from so doing. One defect in baking is this, that there is not so much dripping as in roasting; still there is a little, and this may be applied to some use, as, for instance, for making pies, &c. There is economy of fuel in this mode of preparation, for a poor family might get their dinner cooked at a baker's, for a sum of money which would not supply them with coals enough to warm it through, much less roast or boil it properly; this advantage is confined to towns, where one oven is employed to bake for numerous families.

IV. *Most economical mode of cooking*.—Of the various modes of cooking, boiling is the most economical, for, in the first place, a joint does not lose so much of its weight in boiling as in roasting: (one-third is lost in the latter method, and only one-fifth in the former). Again, the water that the meat is boiled in may, with the addition of a few vegetables, be made into good soup or broth, which will make a dinner for a poor family, and they will then only require one-half the usual quantity of meat. The vegetables for this will not cost much; in the country, people will generally have them in their own gardens, and they will have all the nourishment that was dissolved out of the meat by the water. Although roasted meat is more nutritious on account of the juice not

being able to escape, yet, as before stated, it loses more of its weight than in boiling. The dripping that comes from it should never be wasted, as it may by an economical person be applied to various uses; for instance, it may be used in making the crust of pies, puddings, and other pastry; it will also serve for frying, and in poor families may be used as a substitute for butter.

In conclusion, a few remarks may be added on the nourishing properties of meat. The following table shows the relative digestibility of different meats, &c.:—

	Hours. Min.	
Mutton digests in	3	0
Roast beef	3	0
Salt ditto	5	30
Pork, boiled	3	30
— if salt	4	38
— if roast	5	30
Roast veal	5	30
Turkey, goose	2	30
Fowls	4	0
Venison	1	35
Eggs, soft boiled	3	0

V. *Conclusion*.—It may be here added, that the most valuable qualifications for the recommendation of a cook are honesty, *economy*, and *management*—that she may be able to make some use of everything, so that nothing shall be wasted; for no quality is so bad in a cook, or indeed in anybody, as *wastefulness*, for with care and management all parts of meat and other food may be applied to some use; and she should remember that if she wastes, she is not only indifferent to her own interests, but also to those of her master and mistress.

COLONIAL PRODUCE.

THE following lesson on the Sugar-Cane is intended solely for *Infants*—for the upper classes of an ordinary Infant School—and is therefore intended to be given in as simple and interesting a manner as possible.

THE SUGAR-CANE.

MANY of the children will probably recognise the sugar-cane, on a portion of one being presented to their notice; if not, it will be necessary to tell them the name, informing them at the same time that the lesson about to be given is on that subject.

1. *Locality*.—The map of the world being referred to, a few well-known places may be pointed out in which the sugar-cane flourishes—The attention of the children called to the fact that all these places are situated at no great distance from the equator—The conclusion drawn from this, that it grows only in hot countries (this conclusion to be given by the children, not by the teacher; it being here noted as a rule throughout, that when deductions are to be drawn from any facts previously stated, the deductions are never to be told, but invariably obtained from the children themselves)—The reason why the sugar-cane does not grow in this country—Some of the most important places recapitulated, in which the sugar-cane flourishes.

2. *Description of the Cane and Manner of Planting*.—The outward appearance of the cane examined—Its colour noted to be different within, from what it is without—The notches on the cane referred to—Different articles enumerated on which such notches are found—Thickness of the cane greater at the bottom than at the top—Softness of the interior, and hardness of the exterior noticed. Is the juice likely to be more plentiful in the soft interior or in the hard outside? Height to which the cane grows exemplified by something in the room—a map stand, or some mark on the

wall, for instance, in order to give them some definite idea of what is meant by six or eight feet—The leaves or sprouts at the top noticed—The thickness of the different portions of the stem exemplified by the arm—The appearance which a field of sugar-canes would probably present, suppose we were there examining it, and walking (or trying to walk) through it—A figure of one drawn on the board—When ripe, six inches of the top cut off to be planted—Holes made in the ground—These represented on the black board—Distances at which they are placed from each other, about three or four feet—The cane top introduced—covered up—Supplied with plenty of moisture—Begins to sprout up—Its appearance whilst growing—Its appearance when fully ripe—Men employed to cut it down—The knife which they use for that purpose described—Appearance of the field after the crop has been cut down—Men and women then employed to tie up these canes into little bundles—Reason of this—The canes conveyed to the mill—Why taken there—Method of conveyance, generally by carts drawn by bullocks—Scene pictured as vividly as possible in words, or presented to the eyes of the children in a drawing.

3. *Uses, and Method of Preparation for use.*—The bundles of canes conveyed to the mill—Description of the mill—Two large cylinders between which the canes are pressed, described—Manner of their revolution, the one generally from right to left, the other from left to right—Their proximity to each other—A bundle of canes brought near the cylinders—How they seize it and drag it through the small aperture—All the juice thus pressed out of it—Appearance which it will present on coming out at the other side—Lest any juice should be left in it, it is again passed through—The dry, broken canes even then of use as food for cattle and pigs—The juice collected in a large pan beneath, into which it falls—This pan communicates with a boiler, into which it is run by means of a pipe

—What will be the probable effect of the application of heat—Will it make it thicker or thinner?—Should there appear to be any hesitation here, a simple illustration or two will remove all doubt—the making of pancakes, although not strictly analogous, is sufficiently similar to illustrate the point to infants satisfactorily—Impurities rise to the top—What these are likely to be—Probability that a few pieces of cane will descend with the juice from the cylinders—Necessity pointed out of removing these—How will it be effected—The fact stated that they rise to the top—they will then be skimmed off just as cream is skimmed off from milk—The juice then run off into another boiler, to which a greater heat is applied—Still getting thicker—More impurities skimmed off—and so on until it has become sufficiently thick and pure—It is then allowed to cool, and in the cooling it becomes a solid substance, such as we see it, of a light brown colour—in order to make it white, another process must be gone through, which we shall not enter upon at present—When quite cool and solid (in grains, crystallization having taken place) it is put into casks or hogsheads, such as the large sugar-casks seen in the neighbourhood of grocers' shops—There is still some half-fluid substance mingled with the sugar—This trickles down through the cask—Is allowed to fall through holes made for that purpose in the bottom of the cask—This is treacle, or molasses—Having stood sufficiently long, the holes are closed again, and the casks sent off to Europe, or to their destination, whatever that may be—The different colours of the brown sugar generally indicate different degrees of freedom from molasses. Agreeable flavour which it imparts to our tea or coffee—Its use in preserving fruit, &c.—Might be used for preserving meat also, like salt.

Sugar then being so useful a thing, and prepared with so much labour, it is our duty to be careful in the use of it, and not to waste it, or any other blessing bestowed upon us by the Almighty.

COLONIAL PRODUCE.

THE following lesson on the Cocoa Palm is intended for such children as are ordinarily collected in a National school, and might be advantageously given to eighty or a hundred of them ranged in parallel desks, the teacher being on an elevated platform; or in a gallery, the teacher standing on the floor.

N.B.—An endeavour is made in the early part of this lesson to indicate the method which we should adopt in the giving of the lesson; the object being to tell the children nothing which we can draw from them, either by analogy or picturing to their imagination. The object of this method is to make them *think*, and call into activity every faculty of their mind, if possible.

THE COCOA-NUT TREE.

I. *Locality*.—You can all tell me the name of this? Yes; it is a cocoa-nut. It grows upon the cocoa-nut—tree.* We do not see the tree growing in England—Why?—It grows only in hot countries; those very near the—*Equator*. What zone is the equator in? Well, then, this tree grows only in the—*Torrid zone*. The map referred to, and several places pointed out in which it grows in great abundance, as in Brazil, Guinea, India, &c.—Immense numbers which grow along the sea-coast in these countries. In the southwestern district of Ceylon, for instance, ten millions of cocoa-nut trees supposed to be growing. To what class of trees does it belong? or what general name is given to all the trees presenting the thin stem and feathery and spreading leaves at the summit? The cocoa-nut tree is, then, a species of—*palm*.

II. *Description of the tree*.—The black-board referred to, and the stem of the cocoa-nut tree drawn on it. They will easily discover what the drawing is intended

* Supplied by the children.

to represent. This, then, is the stem of the—*cocoa-nut tree*. Hands up, those that can tell me whether the stem is rough or smooth. Well, you say it is—*rough*. Quite right, there are upon it a number of—*notches*, from the top to the bottom. Now, all look at the board, whilst I make these notches on the stem. Can any one tell me the cause of these notches? Well, I shall have to tell you. What grow upon the top of the stem? (Some may answer, branches, some, leaves.) Properly speaking, there are no branches. What grow upon the top are large—*leaves*. These leaves are very thick and strong where they are joined to the—*tree*. Do they remain there always? for ever? Then, what becomes of them? They fall when they get—*dry and withered*, just as the leaves from—the *oak*, &c. When these leaves fall they leave a notch upon the tree. This deduction the children will be quite prepared to make from what has been already said. Two of these leaves are said to fall every year, and each leaves—a *notch*. If we counted the notches, then, on a tree, and found there were thirty, how many years old would the tree be? The elder children will readily answer, fifteen; but as the younger may not clearly understand it yet, it would perhaps be advisable to recapitulate a little for their benefit. Every one look at the board. What are these I am making now?—*The leaves*. You see they are not quite—*straight*, but are all bent at the ends, ending in a beautiful—*curve*. They are very large, as you see; twice as long as a man. Did you ever see such leaves on a tree growing in England? We have no trees with such large—*leaves*. You see how they are made—A thick, strong stem in the—*middle*, and thin slips, like laths, going out from this upon both—*sides*. If they are so large, and the end which joins them to the tree is so thick and strong, then would you think they were light or heavy? Well, if they are so heavy, and if two of them fall from each tree every year, people walking about below might

find it very—*dangerous*. Is the leaf strong and healthy when it falls? No, it is quite—*dry and withered*. Well, then, before it falls, do you think there will be any noise? What kind of a noise?—*A great rustling*. Yes, there is a very great rustling, just as if the leaf were calling out, ‘Now I am coming down, you had better get out of the way.’ What are these, do you think, that hang from the middle of the trunk at the top? Yes, these are the—*cocoa-nuts*, growing in little—*clusters*, eight or ten in each cluster. Now you have the whole tree drawn out upon the board, look at it, and tell me in what it differs from the oak. First, about the stem; the stem is not so—*thick*. The oak has many—*branches*, the cocoa-nut tree has—*none*. The oak has small—*leaves* scattered all over it, whilst this tree has very—*large leaves*, and all at the—*top*. And what about the fruit? What is the fruit of the oak? *The acorn*. The acorn grows all—*over* the *oak*, but the cocoa-nuts grow in—*clusters*, and all at the—*top*.

III. *Uses*.—First, of the root. People in hot countries very fond of chewing hot, pungent vegetables, which would burn our mouths—one of these the areca nut, which they are very fond of—Grows on a kind of palm-tree—When they cannot get the areca nut they use the root of the cocoa-nut tree, chewing the thinner fibres of the root, in which a pungent juice exists. Let us pass up to the stem. The stem in this drawing not quite straight. It is very seldom straight, but still long pieces of it can be got nearly straight. Trees grow in this country on the outside—The outside new wood, and, therefore, soft—The inside old wood, and, therefore, hard—In very hot countries they generally grow on the inside—The outside will, therefore, be very hard, and the inside softer—The inside of the cocoa-nut tree’s stem very soft; the outside very hard—Easily hollowed out, therefore, and when cut down the middle and hollowed out, used for gutters for houses, which last a very

long time—Without being cut down the middle, too, it is very strong—Used for pillars for huts and houses—When smoothed and polished, very beautiful—black with white dots and threads in it—Also made into chairs, bed-posts and such like.

Uses of the leaves.—A leaf drawn on the board, to show more fully its construction. It is first divided down the middle. The lath-like leaves proceeding from the stem in the centre are then platted, and it is thus used for roofing houses—These lath-like leaves also used for writing upon with an iron-pointed pen. An interesting picture may here be drawn of a native school in Africa or India, the children sitting on the ground, and holding these leaves in the left, whilst they write with the right hand, requiring no desk or benches. When the stem is thus stripped, and cannot be used for anything else, it is cut up, dried, and becomes good firewood.

Uses of the nut.—The nut covered with a rough coating of fibre, to prevent its being broken, in falling from the tree. This fibre made into ropes, mats, and also used for stuffing beds and couches—Very little preparation required—It is merely beaten heavily whilst saturated with water—This operation generally performed by women; it is then dried in the sun, and becomes fit for use. The hard part of the nut, the shell, used for drinking-vessels, and when smoothed and polished, very beautiful—Inside is the white kernel, used for food—Also pressed in a mill, and oil is obtained from it—Cocoa-nut oil—This oil used very extensively by the natives as an article of food—Inside, the milk, a cool agreeable drink in such hot countries. The trees each yield from fifty to a hundred of these nuts every year. A very nice drink is also got from the top of the tree at certain seasons of the year, called toddy by Europeans, a corruption of the native name *tharee*; and a delicious vegetable, something like the cabbage, called the cocoa-nut cabbage, may be cut from the top; it consists of the

young leaves just before they separate; to take this off, however, kills the tree. Agreeable shade thrown on the sea shore by the cocoa-nut trees—Pleasant to walk under—They resemble very large umbrellas.

The lesson may be advantageously concluded by a few words showing how admirably adapted this tree is to the wants of the people for whose benefit it is intended—An evidence of design on the part of Creative Wisdom.

A sketch of the cocoa-nut tree, such as would be drawn upon the black-board to illustrate the above lesson.

SLATE.

LESSON intended for a gallery in a Girls' or mixed school. An attempt is made to interest and improve *all* the children. Such things as they are considered likely to know will not be told, but questions will be put to elicit the information. When the children are supposed to have a *faint* idea of a subject, which they cannot clearly express, the ellipsis is employed, to enable them to do what they can, as also for the advantage of securing attention. The words which the children might probably supply are underlined. The lesson is intended to be simple. No notes would be used in giving it.

I. *Introduction.*

Among all the different things which were to be seen at the Great Exhibition, was a collection of slate, which was called a slate, cabinet; and it is about this I am now going to talk to you.

There was a very large block of slate, which was about 6 ft. long, (this length I should show to the children, by pointing out some object in the room which might happen to be of the same size;) and also very thick and broad. You can tell me what colour the slate was? Yes, it was dark blue.—There was

another great block, partly split into thin pieces, and many heaps of slate which were thin and nicely shaped. Besides these blocks and heaps there were many beautiful things, all of which had been made from *slate*, once like the block I first saw. I shall now ask one of these little girls to tell me what was to be seen in the slate cabinet in the Exhibition.

II. *Whence obtained.*

1. *From the Earth.*—Can any child tell me whether man makes slate? No, he does not, so it is called natural.—How does man get it? Yes, by digging for it.—Because it is dug out of a quarry it is called a *mineral*. Sometimes hills are composed entirely of *slate*; generally, however, men have to dig into the *earth* in order to *get it*.

2. *Quarry.*—The pit out of which slate is usually dug is called a quarry. This name is given to a hollow place in the *earth*, whence stones for building are *dug*. What do you think is got out of quarries besides slate? (Sandstone, marble, &c.) If you were to see a *quarry*, you would notice that the sides were very high and rough, while the middle was a large hollow.—What would cause it to be hollow?—What kind of place do you think it would be for children?—Why would their kind mothers be afraid of their going near?—You see then that it is a dangerous *place*. This kind of pit very likely got the name of a *quarry* from the stones which were taken out being usually of quadrangular form.—Can one of the elder children explain that word?—Many quarries such as I have attempted to describe are to be found in our own country, and several of them contain *slate*—perhaps you may like to know in what parts they are *found*.

3. *Places in Great Britain.*—Slate is found in all the counties of Great Britain.—Name them. (Here a map of the British Isles should be used.) There are also large quantities in the north and south of Ireland. In the north of Wales, near Bangor, it is

particularly abundant, as also in the south. Vast quantities are found in many counties in England, but chiefly in Cumberland, Westmoreland, Yorkshire, Devonshire, and Cornwall.

III. *Uses to which applied.*

1. *Roofing houses.*—Slate forms an excellent cover for houses, and this is the principal use of it. Suppose a large block of *slate*, just as it was taken out of the *quarry*, was to be employed for roofing a *house*, what do you think would be done with it?—Slate which cannot be split into thin *pieces* is not used for this purpose. It is generally split soon after being taken out of the quarry, lest it should become too dry. Some slate of a bad sort contains a number of very small holes, and so is called *porous*.—Can you tell why such slate should not be used for roofing? (If there were time the children might be told of the injury caused by moss and lichens, which grow upon damp slate.)—The way in which it is found out whether or not slate is porous, is by having it weighed, —then soaked in *water*,—and afterwards weighed again.—What would happen if the slate were porous?—Why would it weigh much more?—Would it weigh any more if it were not porous?—Of course it would be a little heavier on account of the wet which remained upon it.—There is another thing to be found out about slate before we can be quite sure that it will do for covering *houses*, and that is whether it is likely to split easily.—What would be likely to cause it to split? (Frost, and the heat of the sun.)—It is known whether or not slate is *brittle* by striking it with a hammer;—if the sound be clear, it is not likely to *split*, and may safely be used for this purpose.

2. *For writing upon, and making slate pencils.*—I am sure every child can tell me another use to which slate is applied.—Yes, for writing upon. Dark coloured, close slate, is generally chosen. Do you observe any difference between the slates with which

houses are roofed, and those upon which we write?—Yes, they are certainly smoother:—in order to make the slate smooth, it is ground with an iron tool, and then rubbed with a piece of stone, after which it is polished.—The pieces of slate are then cut to the proper *size*, and usually framed.

Slate pencils should be made of a much softer kind of slate, or they will be likely to scratch.—Slate which splits very *easily* into thin long *pieces* is the proper sort.—It splits so readily that the workmen are obliged to sprinkle it with *water* when it is first taken from the *quarry*, and then put it into a damp cellar, as the sun or *frost* would cause it to split into the smallest possible pieces.

3. *For the manufacture of various articles.*—Besides the uses which have been named, slate is employed for other purposes, some of which you may be able to tell me. (Gravestones, chimney-pieces, mile-stones, &c. may be named.)

I told you that at the Exhibition there were many beautiful things made from slate. There were some elegant tables, which looked like papier-mâché. I dare say you may have seen tables of that kind. There were many other pretty and useful articles, as ink-stands, finger-plates for doors, a clock-face, and numbers of things which we have not now time to speak of,—but everything appeared of use,—and I am quite sure that if we had not seen or heard about them, few of us would believe that a block of slate which is ugly to look at, could be made into such useful and beautiful things.

IV. *Application.*—Who supplies us with slate?—What kind of mineral is it?—What does God show by giving it to us so plentifully?—How should we feel towards Him who supplies all our wants?

What is required on the part of man to render the slate useful and beautiful?—What lesson should this teach us?

COTTON.

LESSON intended for a first class in a superior National school. The girls are supposed clearly to understand the meaning of ordinary words, and to pay attention without a constant effort on the part of the teacher to secure it—therefore the lesson is more in the style of a lecture than it would otherwise be. The class should be thoroughly questioned at the conclusion, that it may be ascertained whether the subject has been fully comprehended.

I. *Description of Plant.*

1. *General appearance.*—Here is a picture (or drawing) of the cotton plant—perhaps some one may have seen a plant which bears some resemblance to it. (Mallow or holyoak will probably be named; the difference between the plants will then be noticed.)

Cotton is procured from plants belonging to the same class as the mallow.—Do you know what is meant by a “*species*?”—By “*species*” we mean a class or group of created things bearing a similarity in their formation and nature.—When a change is accidentally produced in one of a species—this change not being usually capable of continuance—it is called a *variety*.—Of the cotton plant there are many species, and many varieties of each species.—Some grow large enough to rank as trees, while others are merely shrubs;—they vary in height from less than 2 ft. to more than 20 ft. (The girls would be able to name some objects of similar size.) Can you tell any causes which produce varieties in plants?—Yes, the temperature of the air, the nature of the soil, and the position which the plant occupies, cause a considerable difference in its growth, according as these vary.—The cotton plant which is most valuable, and therefore most extensively cultivated, is not above a foot and a half or two feet high. There was one of this kind to be seen at the Great Exhibition, with its

leaves, and bunches of cotton.—I believe these were tied on, or most likely they would have fallen off, as the tree was dead.—Would a plant of this size rank as a tree or as a shrub?—It is called *herbaceous*, or like an herb, which name is given to all plants that have a soft stem, and die down to the root every year, as herbs do—this kind of cotton plant is also an annual.—You can tell me what is meant by an annual?

2. *Parts of the Plant.*—What was just now said about the *stalk*?—Notice the shape of the leaves—some of you may observe that they are very like those of the sycamore-tree. (The sycamore leaf drawn upon the black board.)—What colour is the flower?—What is its shape? (Of course this supposes that there is a drawing of the different parts of the plant.)—What do you think follows the flower? (The fruit or pod.)—What happens when this is ripe?—If you were to look at the pod just after it had burst, what would you see?—What is the colour of this soft substance?—Sometimes it is not quite white, but a pale buff. Before the pod bursts it is triangular and pointed, so the outer covering bursts in three places, therefore the ball of cotton will be in three locks, one in each cell.—The seeds are covered over by the cotton, which adheres firmly to them; they are very similar to grape seeds.

II. *Method of cultivation.*

1. *Soil and locality.*—The cotton-plant requires a dry and sandy soil. Though rain frequently destroys the harvest, yet the plant generally flourishes best near the sea.—Can you tell how this can be?—The salt spray from the sea, and the salt which is often found in the soil of lands on the coast of a country, prove beneficial to its growth.—That cotton which is produced on the low sandy land near the sea-coast of Georgia and South Carolina in the United States is considered the best.—Most likely you can tell me other countries in which the cotton tree flourishes.

(Many of these would be mentioned by the class, and the rest supplied by the teacher.)

2. *Planting and growth*.—The fields are ploughed in rows about 5 ft. apart, and the seed is then sown along the tops of the ridges.—When it comes up, the poorest plants are removed to give the healthy ones room to grow.—Why should there be more seed sown than is required?—They are weeded and hoed repeatedly, and the earth is raised round the roots to support the plants, otherwise the heavy rains which occur in tropical countries would destroy many of them.—If the weather prove favourable, the cotton is fit for gathering five or six months after it has been sown.

3. *Gathering*.—Women and children are employed to pass through the plantation and gather the cotton when it is ripe. These persons have each a bag round their necks, into which they put the pods after having picked them off.—What part of the pod do you think is useless?—Yes, the husk; this must be very carefully separated from the cotton and seeds—otherwise it is very difficult to clean the cotton. After it is gathered, it requires to be exposed to the heat of the sun for a short time in order to become perfectly dry.

III. *Preparation for exportation.*

1. *Separation from seeds and husks*.—Large quantities of cotton are manufactured into clothing far away from the ground whereon it grew.—Can you prove this to me? (The children will know that cotton is *manufactured*, but not *grown* in England, Scotland, &c.) It has therefore to be exported, before which it is cleared of all that is useless. It goes through a process called *whipping*, by which all pieces of leaves, husks, &c. are cleared away. The seeds are then separated by means of a machine called a *gin*, which draws away the fibre, leaving the seeds behind.

2. *Packing*.—The cotton is now ready for manu-

facture, but yet something remains to be done before it can be received into the ship;—what is that? Great care is required in packing: it is subjected to a most enormous pressure.—For what purpose, do you suppose? You can easily understand that it would take up an immense space if this were not the case. Light, however, as cotton is, you would find it impossible to move a package of it, as it is so closely pressed that a bag which would only occupy 12 ft. of space, would weigh five hundredweight, or nearly as much as four men of ordinary size. The packages are usually called bales.

IV. *Conclusion.*—We will suppose a number of these bales to have been packed on board an American ship, bound for England: to what seaport would the ship sail? Why? Because Liverpool is on the west of England, and also because it is very near to Manchester, the great seat of the largest cotton manufacture in the world. In sailing from the East of America to the West of England, what water will the ship cross? When the cotton arrives at Liverpool, what do you think is done with it? (It is sent to Manchester to be manufactured.) The journey from Liverpool to Manchester is performed by railway; having arrived at Manchester, we shall be compelled to deposit our bales of cotton in the large factories, and take another opportunity of seeing them made into calico.

CANADA, AND ITS PRODUCTS.

Lesson intended for students in a Female Training School. A rough map, such as is here drawn, might be sketched upon the black board; and the pupils should also have their maps before them. Such things as they could discover from the map should not be *told* them—neither things which they know; a lesson to elder pupils must be more in the style of a lecture than one given to children. At the conclusion, the students should be thoroughly questioned.

I. *Introduction.*—The Canadian department at the Great Exhibition was one of very great interest, and this may in some measure be attributed to the number and variety of articles which were there displayed. There was a mixture of English comfort and civilization, with the barbarism of savage life; and also the productions of cold, temperate, and tropical climates. (These statements would require exemplification.) I think a person could scarcely help lingering to examine this department, and while doing so, he might almost imagine himself in the country whence all these curiosities came. In talking to you to-day about the productions of Canada, I shall first give you a slight sketch of its Geography. What relation does Canada bear to Britain? When did it become a colony of our Empire? Under what circumstances? (These facts would certainly be known to a class of Students.)

II. *General description of Canada.*

1. *Position and boundaries.*—(To be found out from the map by the Students, as also any peculiarity in shape; separation between Upper and Lower Canada, &c.)

2. *Dimensions.*—(The pupils have been led to see that the greatest extent of land is in the direction of

E. and W., and that the width is various.) Greatest distance from E. to W. is about 1,400 miles, while from N. to S. the country varies in breadth from 200 to 400 miles.

3. *Natural features. Rivers.*—Contains very important rivers, the chief of which are the St. Lawrence and the Ottawa; the other rivers, which are very numerous, empty themselves either into these large streams, or into the enormous lakes which form the whole southern boundary of Upper Canada. Do you observe anything remarkable respecting these lakes? (Their vast extent, communication with each other, and connexion with the Atlantic.) The position of the chains of *mountains* you can observe by looking at the map. Vast *forests*, abounding in every variety of timber trees, cover a very large proportion of the surface of the country. *Soil*, very various, the banks of the St. Lawrence and the district between the lakes Ontario and Erie, and Lake Huron—are the most fertile, and therefore the most thickly populated. *Climate.*—The Canadian summer is much hotter than ours, and the winter much colder; account for this. The snow sometimes remains upon the ground for a period of four months, and as the rivers are usually frozen over at the same time, navigation is impeded. When the frost has set in, the inhabitants travel about in sleighs, such as were to be seen at the Exhibition. I think many persons must have been struck with the peculiar lightness and beauty of these carriages, as also with the enormous thickness of the Buffalo robes worn by those who travel in them: it certainly seemed to me impossible that the air could penetrate through them.

III. *Natural productions.*

1. *Timber.*—There were some splendid specimens of Canadian timber in the Exhibition; and the great variety was very remarkable. Large quantities of white and red pine are exported, as well as bird's-eye maple, elm, pine, ash, oak, spruce, butternut, birch,

black walnut, &c. Of the last-named wood large quantities of furniture are made, as also of the different species of maple. The timber trade finds employment for a large proportion of the inhabitants on the banks of the Ottawa, as also of other parts. The men who follow this calling generally contract low habits, and are most commonly drunkards. They are employed in the depth of the winter in felling the trees, and are exposed to the greatest severity of climate; when the frost breaks up, they fasten together the rafts of timber, build their temporary dwellings on the top, and float down the thawing stream, being assisted in their progress by the tide. After they have sold their timber they generally pass several weeks in idleness, squandering their money on drink and tobacco, as well as many useless articles of dress. These men are called lumberers.

2. *Fur*.—The animals of this country which are particularly valued for their fur, are bears, wolves, foxes, martins, squirrels and beavers; these are very abundant. The collection of furs first opened an intercourse with this part of America. Animals bearing the thickest fur are only to be found in the very coldest climates. (Probably you can give me the reason for this.) The fur traders are exposed to very many dangers and hardships, which persons who derive the benefit of their labours know little of. They have to cross seas, and pass through wild and trackless deserts which swarm with mosquitoes and other annoying insects in the summer, and are covered with ice and snow during the winter, besides being inhabited by savage tribes.

The traders are now associated into a body called the North West Fur Company of Montreal, and the trade is carried on with considerable energy and success. There is a regular line of forts established, so that these adventurers have communication with the whole of the northern district of America from the Atlantic on the east, to the Pacific on the west.

3. *Minerals*.—Canada contains considerable quantities of *metals*—gold and silver are found in many parts, but not in abundance. Iron is very common, copper is found round Lakes Superior and Huron, and lead in many places. The greatest abundance of metals seems to exist round Lake Superior. There are also many other minerals, such as coal, salt, slate, sulphur, building stones, precious stones used for making jewellery, stone paints of very beautiful tints, &c. Of most of these there were specimens at the Exhibition.

4. *Fish*.—Large quantities of fish are found in the lakes and rivers of Canada. The herring, cod, and salmon fisheries are very considerable: the sturgeon is very common—large shoals of seals are occasionally seen. Fish oil is exported.

5. *Fruits and vegetables*.—From what was said respecting the climate of Canada you will easily suppose that the vegetable productions are very various. All the vegetables which grow in England flourish there, as well as the fruits of the south of Europe, and the timber trees of the north. The extremes of climate are by no means unfavourable in this respect; the heat and cold are steady, and the air is celebrated for its purity. (From what has been said the class would be able to name the fruits which grow in Canada.) A brief notice of Canadian corn, as being a source of great profit.

IV. *Manufactures*.

The manufactures of Canada are generally more useful than ornamental; yet many handsome articles were in the Exhibition. There was a fire-engine of peculiar beauty, as well as much handsome furniture suited for drawing rooms. The sleighs and harness were mentioned to you before as being of good workmanship. The domestic articles, such as pails, &c. seemed to be particularly well made. They had brass handles and hoops. The agricultural tools appeared strong and suitable. There were specimens

of linen, woollen, and cotton goods of excellent quality; also fire-grates, fancy soap, candles, &c., taking in, as you see, a wide range of manufacture.

NOTES OF A LESSON UPON QUEEN PHILIPPA'S MONUMENT IN THE GREAT EXHIBITION.

This Lesson is intended for Pupil-Teachers who are in the last year of their apprenticeship, and have been well grounded in the outlines of English History.

Description of the Monument.—The restored copy of one erected over Philippa's tomb in Westminster Abbey—Sculptured in 1370, by Hawkin Liege, a Frenchman—Cost 133*l.* 6*s.* 8*d.*: equal to about 2,000*l.* of our money—It contained thirty-two statuettes, each in a separate niche—A correct list of the names has been preserved—The portion represented in the copy at the Exhibition—The head of the altar-tomb, carved in English Alabaster and partially overlaid with gilding—Contains five full-length figures, placed in niches and dressed in the costume of the fourteenth century. In the centre, Edward III., Philippa's husband. On the right, William of Hainault, her father; John, king of France, her uncle's son. On the left, Lewis, emperor of Germany, her brother-in-law; Edward the Black Prince, her eldest son. The niches are surmounted by carved work and figures of angels.

The whole executed from the dilapidated original, and from some remains discovered in an adjacent tomb.

Brief account of Philippa's History previous to her marriage.—The daughter of Count William of Hainault—Her previous connexion with the English Royal Family by the marriage of Count William.

with a cousin of Isabella, wife of Edward II.—Sojourn of Prince Edward at the Court of Hainault—His attachment to Philippa—returns to England—He demands her in marriage—obtains the consent of her father.

Philippa's Marriage.—Journey to England—her arrival in London—joyful welcome given her by the people—Date (Dec. 23d. 1327)—Absence of the young king in the North—War with the Scots—Philippa sets out for the North—Union with Edward at York, Jan. 1328—Return to London—Departure of the Queen's retinue to Hainault.

Her Coronation, and events of the same year.—Crowned at Westminster Abbey, 1330—Absence of all unnecessary pomp and splendour—Reason—Isabella's extravagant appropriation of the royal funds to her own use—Birth of the Prince of Wales—Tournament held in Cheapside in honour of the event—Sudden fall of the scaffolding—Danger into which the queen and her ladies were thrown—Violent rage of Edward—His determination to put to death the men who had constructed the gallery—Is dissuaded by the eloquence with which Philippa pleaded for their pardon.

Her endeavours to improve the condition of the people.—Skill of the Flemish men in the Art of Weaving—Ignorance of the English in this branch of Manufacture—Philippa's letter to John Kempe of Flanders, inviting him to come and settle in England—Arrival of Kempe, accompanied by a colony of Weavers and Dyers—Their settlement at Norwich, 1335—Great success of the project; its value to the English—Frequent visits paid to the colonists by the Queen—Gratitude with which she was always received—The Queen, some years after this, turns her attention to the Tyne-dale coal-mines—Previous opening of these in the reign of Henry III.—Neglected in consequence of the wars with Scotland—Reopened by Philippa—Her careful selection of competent superintendents. The wealth and commercial importance which have since

accrued to the English, in consequence of these judicious acts.

Philippa accompanies her husband into the North of England.—Edward besieges Berwick—The Queen fixes her residence in Bamborough Castle—There besieged by Douglas—Failure of the attempt—Triumphal entry of the King and Queen into Berwick—

Birth of her children.—Birth of Princess Royal, 1333—Of Princess Joanna, 1335—Of William of Hatfield, 1336—His death when only a few weeks old. Visit of Edward and Philippa to Antwerp—Birth of Prince Lionel, 1338—Return to England—Birth of John, (afterwards called John of Gaunt) on the day of Edward's greatest naval victory over the French gained off Sluys, 24th June, 1340.

Death of her Father.—Liberality with which Count William had assisted Edward to carry on the French wars—His death, 1338—Extreme poverty to which Edward and Philippa were then reduced—The Queen's jewels pawned to raise money, 1339.

History of her Regency.—Departure of the King and the Prince of Wales, to prosecute the war in France—Appointment of Philippa to the Regency—Her ability to conduct the national affairs—Receives the first English Military Despatch ever written—Its contents—The details of the victory at Cressy—Invasion of England by David, king of Scotland—The Queen hastens to the relief of her Northern subjects—Prepares to give battle to David—Her exhortation to the army—Her display of high moral courage, together with mercy, and antipathy to bloodshed—She withdraws from the battle-field to pray for her invaded country—The victory of Neville's Cross—King David taken prisoner after a brave struggle—Captured by John Copeland—The latter refuses to surrender his prisoner to Philippa—Her letter to Edward—Copeland is, in consequence, ordered to Calais—He is rewarded for his bravery, but ordered by the King to deliver David into the hands of Philippa—His compliance and excuses for his former disobedience—

The Queen generously grants him her full forgiveness—Consignment of David to the Tower.

Remaining events of her Life.—Her visit to Edward's camp at Calais—She is accompanied by many of her ladies—Her intercession for the six citizens whom Edward had doomed to death—Birth of the Princess Margaret—Return of the Royal Family to England, 1347—The Great Pestilence of 1348—Immense number who were swept away by it—Death of the Princess Joanna, struck by the Plague whilst on her road to meet the Infant of Castile, her betrothed husband—Grief of Philippa for the loss of her daughter—Arrival of the royal prisoners, John of France and his little son, 1357.—The courteous reception they received from Philippa—Marriage of the Black Prince.

Her Illness and Death.—Philippa is attacked by a fatal disorder.—Absence of all her sons upon the Continent with the exception of Thomas of Woodstock—Her three death-bed requests—Edward's promise to grant them—Their purport :

1st. The fulfilment of all engagements into which she had entered with merchants for their wares.

2d. The payments of all gifts and legacies to the Church, and to her servants.

3d. Her wish to be buried in Westminster Abbey, and for Edward, after his death, to be placed by her side.

Her death (14th Aug. 1369). Grief of her husband, her children and the whole nation.

Her tomb. Her body afterwards placed at Edward's feet ; not at his side according to promise.

Her Character.—Her virtue, and love of justice—Her judgment and ability, as proved by the transactions of her regency—Her readiness to forgive injuries—Her interest in the welfare of the nation—Her clemency and generosity—Her influence upon the actions of Edward—The distractions which arose in his family and court after her death—Her excellence, not only as a *Queen*, but as a wife and mother.

NOTES OF LESSONS UPON THE MANUFACTURE OF
MOROCCO AND GLOVE LEATHER.

These Notes of a Lesson are such as would be drawn up as specimens for the instruction of a junior class of students in training, with a view to preparing them for the production of Lessons to be given to children in National Schools.

LESSON I.

THE VARIOUS OPERATIONS WHICH LEATHER UNDERGOES PREVIOUS TO
TANNING.

Introductory remarks.—Importance of leather as an article of daily use—Skins of animals used for clothing in the earliest ages and in nearly all parts of the habitable globe—(Require pupils to give examples).

Flexibility and elasticity of skin when taken from the animal. (Draw from the pupils the meaning of the words *flexibility* and *elasticity*.)

Change which ensues when the process of dyeing commences—Necessity of some method by which to restore the original properties and render the skin fit for use.

Anglo-Saxon term for this transformation, Lithe or Lithier (*i.e.* soft, yielding): hence our word leather.

The distinct parts of which the hide or skin of an animal consists.

I. The epidermis or cuticle—covered with hair or wool.

II. The reticulated, or net-like tissue.

III. The dermis or *true* skin—lying nearest the flesh—A thick, hard membrane composed of fibres interlacing each other. (The word *fibre* to be explained with illustrations): also of a substance called *gelatine*, from its jelly-like appearance when in solution. (Explain the word *solution*.)

The dermis, or true skin, only can be converted into leather—hence the necessity of getting rid of the other two parts previous to commencing the operation of tanning.

Method of preparing skins covered with HAIR.—If imported they require soaking in water for ten days, before undergoing the following operations:—

1st process. The skins placed in oblong pits with lime and water until the hair becomes loosened.

2d. When sufficiently soaked, taken out, placed upon a cylindrical table, termed a *beam*, and scraped with a large two-handled knife—The hair thus removed is sold to plasterers—Use, mixing up with mortar.

3d. The skins put into pits with a solution of dogs' or pigeons' dung.—Use of this process—The dissolution of a portion of the gelatine—Consequent decrease in the thickness of the skin. Great care required in removing the skins at precisely the proper time—Injury which their texture would sustain if permitted to remain too long in the solution.

4th. Again worked on the *beam* to remove all dirt and slime.

5th. Immersed in a weak solution of sulphuric acid, by which the pores are prepared to receive the *tan*. Skins in this state are termed *pelt*, and are ready for removal to the tan-yard.

Method of preparing skins covered with WOOL.—Injury which these would receive if soaked in lime and water according to the process described above—Necessity of preserving the wool when removed from the skin—Italian lamb-skins—Immense numbers imported annually in casks—Sent in this state to the tanners.

1st. Cleansed in water—Scraped on the flesh side.

2d. Sweated. Shut up in a close, dark room and *sweated* or fermented until a thick slime appears on the surface—Effect, easiness with which the wool can be pulled off after this process.

3d. Removal of the fat by means of a powerful press—Large numbers of skins piled together for the purpose.

4th. Skins worked upon the beam—Rough edges and projecting corners pared off for the glue-maker.

5th. Placed in lime from two to six weeks, to prevent putrefaction.

6th. Removal of lime by again working on the beam and by immersion in bran and water. Finally washed in pure water.

Appearance of the pelt after undergoing these operations—A thin, white, elastic membrane—fitness for tanning and dressing.

LESSON II.

ON DRESSING MOROCCO LEATHER.

Specimens of Morocco leather at the Exhibition.—Beauty of their texture and colour—Prepared at the manufactory of Messrs. Bevington, Bermondsey.

Skins which are used for the purpose.—Goat skins—Imported chiefly from the Barbary coast and the Cape of Good Hope—Number annually exported to England, about 300,000 skins.

Substance used in tanning morocco.—*Sumach*—The dried leaves and leaf-stalks of a shrub growing chiefly in Hungary and some of the smaller Austrian States. Large quantity of tannin (*i.e.* tanning matter) which exists in this plant.

Preparation of skins according to method detailed in the last lesson—(The pupils to give an account of the process of preparing hairy skins for tanning).

Dyeing.—Removal of pelt to the tan-yard—formation of each skin into a bag, sown by the edges with the grain-side outwards—Distended with air and closed up—plunged into vats containing dye of the required colour—Worked about until uniformly dyed. Two-fold object of forming the skins into bags:—

1st. Economy of the expensive dye-stuffs by thus colouring the skins on one side only.

2d. Perfectly equable action of the dye and of the sumach upon all parts of the surface.

Tanning.—The skins filled with a solution of sumach and some leaves of the shrub—The solution poured through a funnel into the bag by means of a hole in the top—The bag further distended with air and closed—thrown into a large tub of sumach, and kept in motion by machinery for three hours—When taken out, placed upon a shelf in piles—Result of this mutual pressure—Gradual entrance of the sumach into the pores of the skin—None of the liquid permitted to exude through the seams—Submersion in a stronger solution—Completion of the tanning by this process. The skins ripped open and drained—Stretched upon a board—Rubbed smooth, and dried in a loft.

Currying or finishing.—Horny texture of the skin when removed from the drying-loft—Stretched upon a board and worked with a *pommel* and with a glass ball.—Description of *pommel*—A hard, flat wooden instrument, the back furnished with a leathern strap in which to insert the hand—Firmness and compactness given to the leather by this means.

The *grained* appearance of Morocco leather—means by which this is produced—Firmly pressed with a piece of hard box-wood, containing a number of narrow ridges round its circumference—Pliability and softness produced by this, the concluding process. (Explain the words *circumference* and *pliability*.)

Imitation Morocco.—Prepared from sheep-skin by a method similar to the above with a single exception—The skins split while in the state called *pelt*—Each divided into two of the original size, but only half the thickness of the pelt—The “skin-splitting machine”—Beautiful and precise manner in which it divides the pelt.

LESSON III.

ON THE PREPARATION OF WHITE LEATHER FOR GLOVES.

The kinds of skin used for the purpose.—The best gloves prepared from kid—Inferior from Cape sheep and Italian lamb-skins.

Materials used for dressing such skins.—The necessity of employing such materials only as will produce a *pure, white* leather—Alum, salt, flour and eggs—Specimens of these articles and of kid gloves deposited in the Exhibition by Messrs. Bevington—Technical term for the dressing of leather with alum, salt, &c., *Tawing*—Kid, sheep, and goat skins reduced to *pelt* by the process given in the first lesson. (The pupils to recapitulate.)

Tawing.—The preparation of a solution of alum and salt—Proportion, 3lbs. of alum and 4lbs. of salt to 120 middle-sized skins—The skins placed with the solution in a hollow cylindrical machine, technically called a *drum*—The rapidity with which the drum rotates—Action of the alumina upon the gelatine of the skin—Whiteness produced by the salt—The skins carefully rinsed in water—Necessity of obtaining the latter in a pure state—Distilled water used for the purpose at Messrs. Bevington's factory—Soaked in bran and water—consequent removal of all superfluous alum and salt—Transferred to the drying-loft—Stretched upon hooks until perfectly dry—In this state tough and dry—Means by which gloss and softness are imparted to the leather—Dressed with a paste—The component parts of the paste, 20lbs. of finest wheat flour to the yolks of eight dozen eggs—Dilution with water—The skins placed in the drum with the paste—The egg-liquid so completely imbibed by the skins as to leave little else than water remaining in the drum—Repetition of dressing with the paste—Immense quantities of eggs consumed annually by

this process—Imported principally from France and Belgium—Preserved in the factory at Bermondsey by being placed in pickle—The skins dried after this second dressing.

Finishing.—Placed in water for a few minutes—Worked upon a flat board—Staked or stretched upon a smooth iron plate which is placed upon an upright beam secured to the floor—Extension and smoothing of the skin by this means—Lastly smoothed with a hot iron—In this state fit for the glover.

Dressing leather in oil.—Use of this process in the preparation of wash-leather and doe or sheep-skin gloves for men—Removal of the *grain* side of the leather by scraping the surface with a round knife—The skins placed in bran and water—Wrung out—Spread upon a table—Sprinkled with oil and folded up four together in the shape of a ball—Beaten in the “fulling stocks” by a number of large wooden hammers, the heads of which are covered with copper—Taken out and exposed to the air—Frequent repetition of the oiling and fulling process until all appearance of grease disappears—Hung up in a warm room until they ferment—Consequent opening of the pores for the reception of the oil—Scraped with a blunt knife, and scoured in a warm lye formed of potash, to extract the superfluous oil—Washed in pure water and dried—Smoothed and stretched by being passed between iron rollers—Completion of the process.

M A I Z E.

This Lesson was suggested by seeing some fine specimens of maize, from Canada, in the department of America at the Great Exhibition.

It is intended for a high class in a juvenile school, and some parts to be given by means of questions, *i. e.* when there is anything which it is likely the children will be able to find out themselves.

I. Description and locality.

1. *Description*—(an ear of corn being presented to the children.) Maize, or, as it is sometimes called, Indian corn, is the largest and handsomest of all grains.

(1.) *The stalk* of the plant is straight, thick and knotted, something like cane, but much thicker.

(2.) *The leaves* are broad and long, gradually slope off in a point towards the top—of a yellowish white colour, growing out from the stalk near the knots or joints.

(3.) *The grain*, of a yellowish colour, grows closely round the top of the stalk, in shape something like flattened peas. A great many ears grow from the top of the stalk; some shoot out from other parts, generally near the knots; these ears are enclosed by the leaves. When the grain is ripe, the ear shoots out between the leaves, and being of a nice colour, very smooth and closely set together, forms a very pretty appearance. (This information may be drawn from the children by showing a specimen of the corn.)

2. *Locality*.—Grows in the United States of North America, California, Canada, and Carolina. (In South America), Paraguay, and Chili. (Europe), south of France and Italy. (A map to be brought before the children and these places pointed out.)

II. Method of cultivation.

1. *Soil*.—This plant requires a fertile soil; where

the land is not naturally fertile it must be made so ; it requires attentive cultivation.

2. *Mode of planting.*—The seeds are planted in rows, a space from two to four feet being left between each row, so that the ground may be weeded easily and the earth fertilized by exposure to the air. In warm climates the plant soon appears ; in fine weather it will be up in five or six days. When three or four inches high, the plants are thinned to two feet apart, so that there may be more ears on each stalk. When they are three or four feet high they are again thinned and weeded, and the ground raised round the stalk to cover the joints which are at the bottom ; from these fresh roots spring out. The earth which is raised round the stalk is flattened at the top, and hollowed out from the stem to collect the dew and rain in dry seasons. When the plant is nearly fit for cutting, turnips and cabbages are planted between each row of corn—sometimes French beans, but these are not advisable, as they are likely to shade the maize and prevent the growth.

3.—*Time for cutting.*—When the leaves which enclose the ear begin to open and appear dead, the corn is ripe and fit for cutting. This is done by twisting the ears off with the hand, after which they are laid in a dry place, occasionally being turned to prevent them from becoming mouldy ; the seeds keep better in this way than if separated.

4. *Mode of taking the seeds from the ear.*—This is very tedious work. It is done by fixing an iron hoop over a tub ; the ears are rubbed over this edge, and the seeds fall into the tub. Another method is by rubbing the ears on a blunt sword. The leaves, with the exception of those round the ear, are gathered while green as food for cattle.

III. *Uses of plant.*—Next to rice it supplies food to the greatest number of the human race. It forms the chief part of the food of the Americans—it is pounded by them into meal and made into bread, and serves

the same purpose to them as wheat does to us. Every part of the plant is of some use.

1. *Stalks* are soaked in water and used for feeding animals, especially horses, pigs, and poultry; they are fonder of it than of all other corn; it gives a fine flavour to the flesh of the two latter. The stalks may also be dried for hay, and will keep good for two or three years; in this state it must be soaked before feeding cattle, as it gets very hard in drying.

2. *The husk* which surrounds the ear is made into a beautiful kind of writing-paper, (at a paper-mill in Italy,) not the same as we use, but a more expensive kind, very scarce; the husk is used in America for stuffing beds, and is very soft and comfortable.

3. *The ears*.—When the young ears are beginning to form, they have a sweet, agreeable taste; if at this time the leaves be stripped off, a milky juice may be made from them. If converted into malt, will make a wholesome drink.

IV. *Moral Lesson*.—How manifest is the goodness and wisdom of Almighty God! First, here is shown His *Goodness* in providing us with everything for our existence and comfort, and fitting all for their several uses. *Wisdom*—in so widely distributing this corn in those countries where wheat is not grown, that those people who have not one kind of corn have another which serves them the same purpose as our wheat. Our feelings to God should be those of gratitude for the numerous benefits and mercies constantly bestowed on us. Reference might be made to Scripture, showing the children that it is our duty to be thankful for all we receive, “in everything giving thanks, for this is the will of God in Christ Jesus.”

HONEYCOMB.

This Lesson is intended for an upper class in a National School: to be given as much as possible by means of questioning.

I. *Nature and Structure.*—Honeycomb consists of a number of cells made by bees from wax, an adhesive substance which they gather from the buds of trees, flowers, &c.

It is found in all parts of the world, and is often referred to in Scripture as being very plentiful in Canaan:—that country being spoken of as “a land flowing with milk and honey.”—Exod. iii. 17.

In countries where bees live in their wild state, they make their comb wherever they can find a convenient place, sometimes suspending it from the boughs of trees, and at others from the roofs of cavities found in the rocks. This accounts for what we read in 1 Sam. xiv. 26,—“And when the people were come into the wood, behold the honey dropped.” And in Psalm lxxxi. 16,—“With honey out of the stony rock should I have satisfied thee.” In the Indian islands the forests swarm with bees, and the comb may be seen hanging from the boughs. In Africa reed baskets are hung on the trees, which the bees readily occupy, and when full of honey the people are able to get it with very little trouble.

In our country, bees are kept in a kind of basket called a hive, similar to those used in Africa: but instead of being hung on trees, they are put on a plain stone raised about $1\frac{1}{2}$ foot from the ground. But although placed in this way, they follow their natural mode of building—making the comb to hang from the roof of the hive. A comb is first begun in the centre of the roof; when a few rows of cells have been made, two other combs are begun, one on either side

of the first, and so on until the width is taken up, each comb becoming smaller towards the sides. The spaces between the combs are in exact proportion, being during the summer about $\frac{3}{4}$ of an inch in width. The cells are formed horizontally, with a partition in the centre, forming a foundation for the cells on both sides of the comb.

The cells have six sides (name given to this shape, *hexagonal*). These cells are made longer towards winter—How?—What effect would be produced on the spaces?

In several parts of the comb holes are made, forming passages from one space to another.

II. *Adaptation to the wants of the bees, and use to man.*

1. *Adaptation to the use of the bees.*—The combs are at equal distances of $\frac{3}{4}$ of an inch, that there may be room for the bees to pass each other while storing away the honey and attending to the young—Spaces contracted towards winter to preserve a greater degree of warmth, when the business of gathering honey is over.

The cells being opposite each other, room and material are saved, as one foundation will serve for both. Being hexagonal, the nearest shape to a round, which is most suited to the shape of the insects which live in them until they are of a certain age, the loss of room is avoided which would be made if the cells were round. The holes made through the comb in different parts forming passages, save the time which would otherwise be taken in going round the comb.

2. *Use to man.*—Honey was much used in the early ages of the world by man as food—Why?

We read that Jonathan, when returning from the slaughter of the Philistines, ate honey, (1 Sam. xiv. 27.) Honey was part of the food of John the Baptist, (Matt. iii. 4,) and a piece of an 'honeycomb was given to our Lord when he asked for food. (Luke xxiv. 42.)

In our country, honey is used occasionally instead of butter, and sometimes instead of sugar. When clarified, it is an excellent remedy for colds and sore throats. It is used by apothecaries in the composition of some kinds of medicines. A kind of wine called mead is made from it, which was much used at one time in this country. The wax or substance which is left after the honey is quite strained off, is used for making candles, cleaning furniture, &c.

III. *Moral Lesson.*—The skill and industry shown in the honeycomb should excite in us a desire to imitate the industry and perseverance of the bees; being sure that if these little creatures are able by the instinct they have to perform such a useful and beautiful work, we who have greater gifts bestowed upon us shall, if we use those gifts properly, meet with a proportionate degree of success.

W O O L.

This Lesson is intended for a high class in a National School; to be given as much as possible by means of questions, and ellipsis, never telling the children anything which could be obtained from them; the places mentioned are to be pointed out on a map.

This Lesson was suggested by seeing the Wool in the Great Exhibition, and from the various manufactures—for instance, the Leicestershire goods.

By way of interesting the children, they might in the course of the Lesson be told of a person—by name Sir John Throgmorton—who once sat down to dinner dressed in a coat, which in the morning had been wool on a sheep's back: proving the wonderful rapidity of steam-power machinery, &c. Another fact—In the Great Exhibition is the fleece of a South-down ewe, which belonged to Mr. J. Moore, a farmer, of Pewsey in Wiltshire: the sheep lived to be seven years old; it was never shorn; the length of the wool is twenty-five inches. The whole fleece weighs 36 lbs.

I. *What wool is, and its locality.*—The sheep is the principal animal covered with wool—As taken from

the sheep it is called a fleece—How it differs from hair—Sheep are shorn, (explained,) generally every year, but the animal is first washed in a clear stream—Reason of this—At the proper time of the year, usually in June, they are shorn—Why at this time?—Because the old wool will have become loose, and young will be growing. Each fleece is then wound up by itself very tightly, and sold to a person called a wool-buyer. Wool produced in different countries or counties, has a separate name by which it is distinguished—Examples: Australian Wool, Leicestershire, South Down, &c.

The *quality* of wool differs in different parts—Some is fine—other, coarse—Reason of this—Fineness of wool is influenced by temperature and food. In hot countries, wool is coarser and thinner than in cold.

The sheep is found nearly all over the globe, and in every county in England, although the wool itself is different—even in the different counties of our own country—For example: The Leicestershire sheep have very long wool—The South Down very fine and short wool, &c.

Different kinds of wool from one fleece—The *long wool*, which is called *combing* wool, about eight or ten inches in length, is made up into such articles as stockings, flannel, &c., which do not require the wool to be twisted so tightly. The other is the *short wool*, called *clothing* wool; this is about four or five inches long—Is made up into cloth of which garments are made.

II. *Its manufacture*.—1. *Of the long wool*, which is called the worsted manufacture, because it is not cut, but combed out in the whole length. It is first washed and scoured—Reason of this—To clear away the grease which is always attached to the wool, even though it was washed when upon the sheep's back: the wool is then dried in a heated room, and afterwards passed through a machine called the *plucker*, which cleanses and straightens the fibres; it

is next combed—this makes the wool nearly ready for spinning. *Wool-combing* in former times always used to be done by the hand—one workman—but is now generally done in a machine. After combing, the wool fibres go through a machine which converts them into a long roll, called a roving—might be compared to a soft woolly riband—this is then drawn through another machine, which thins as well as lengthens these fibres.

The rovings, as they are called, are passed through several machines, each of which draws and twists them more, as required for different articles. The worsted yarn, thus produced, is then spun—woven and dyed, if desired. Articles which are made up in this way are hosiery, carpets, &c.

2. *Manufacture of the short or clothing wool.*—In this case, the short wool, as with the long, is sorted as regards the fineness, strength, &c. It is then washed and scoured, and goes through a great many other processes, (more than worsted articles, before described;) because the cloth after it is woven requires several things to be done before it is fit for use; such as being dyed, and sheared.—This last mentioned process, namely, shearing, is done by cutting off the rough fibres which are upon the cloth: it is then well brushed to make it smooth and glossy. The goods made in this way, such as cloth, &c., are packed very tightly, several whole pieces together—this package is called a bale—a bale of cloth.

The *worsted* is not packed in this manner; it is, when in the form of yarn, made up into hanks—bundles—of several hundred yards each, a pound in weight generally; these hanks are sold and made up in different ways into garments—for example, in Leicestershire, where nearly all the worsted stockings are made, there are 10,000 or 12,000 stocking-frames in use, and each of these frames requires but one person to work it.

III. *History of the manufacture, and places where*

it is carried on.—We find that from a very early period, wool has been made up into goods—woollen garments were early used; but they were made and worn in some countries much sooner than in others. In Spain, Italy, and France, wool was manufactured at a much earlier time than in England.

Wool is very frequently mixed with cotton and silk for goods—such as mousseline-de-laines for example.

Since about the time of William the Conqueror, wool has been manufactured into goods in England.

Chief places in England for cloth, &c.—*wool manufacture.*—In the *West of Yorkshire* there are about twenty towns and villages—Some of these to be mentioned—For example, at *Halifax*, flannels, baizes, and cloth for soldiers' coats are made—(What colour would soldiers' cloth be generally?—What process gives it this colour?)—Leeds, for blankets and stuffs, &c.

In *Gloucestershire*, the finest broad-cloth is made from the Spanish, Saxon, and Australian wool. In *Wiltshire*, fine cloth is made. There are several villages in *Somersetshire* where woollen goods are manufactured. *Gloucestershire* has more factories than any other county in the West of England—there are quite 100 woollen factories.

In *Norfolk*, goods—chiefly stuffs, were made, but now most of the Norfolk yarn is spun in Yorkshire.

Chief places of worsted manufacture.—*Leicestershire*—chiefly noted for stockings, but flannel waistcoats, &c. are also made. *Devonshire* and *Cornwall* noted for carpets—coarse, such as druggets. Carpets are made at places in different counties—For example, *Kidderminster*, in *Worcestershire*—*Wilton*, in *Wiltshire*, &c. *Salisbury* is noted for flannels—*Witney* for blankets. The former goods are made at other places, but those mentioned are the principal—as also other goods unmentioned are manufactured in England.

Wool and worsted manufactures are carried on in Wales—not a great deal in Scotland, at least the manufacture of fine goods; and very little is done in Ireland.

THE BEAVER.

This Lesson, suggested by a stuffed Beaver in one of the galleries of the Great Exhibition, is intended for a middle class in a Juvenile School. Many points in it some of the children would most likely be acquainted with, and the information they possess should be drawn from them by means of questions. The ellipse should also be made use of, to keep up the attention of the class, and to impress upon them any information which has been given,

I. *The locality.*—The Beaver is found in Europe, Asia, and America, but by far the greatest number in America. Not any are found in Africa. The Beaver is very commonly met with on the banks of large rivers, *e.g.* Rhone, Danube, Euphrates, St. Lawrence, &c. (The situation of these rivers should be pointed out on the map.) The Beaver was formerly common in Great Britain, but none are found now.

II. *Description.*—As we now know where the Beaver is found, we must next see what sort of an animal it is, and in so doing shall speak of

1. *Its appearance.*—The length from the head to the tail of a full-grown Beaver is sometimes, but not always, forty inches; that is, one yard and four inches. (A board or something this length should be shown the children.) It does not arrive at full size until about three years old. The tail requires particular attention, being very peculiar; it is flat, covered with scales, (scales must be explained,) and in shape is very much like the end of an oar. The Beaver guides itself with

this when it is either going under, or coming out of the water. On each of its four feet it has five toes, but still there is a difference between the fore and hind feet; in the hind the toes are joined by a hard tough skin which grows between them, just like the feet of some birds, (children would most likely be able to tell the names of these birds,) and this enables them to swim; hence they are called "*web-footed*." At the end of each toe it has a very strong slightly hooked nail, and that on the second toe of the hind foot consists of two portions. The Beaver is covered with a thick fur, generally a glossy, brownish black; some have been found white, some yellow, and an Indian once found three with large white spots on their breasts, the rest of their bodies being black; these varieties are however very rare. Its front teeth are remarkably strong, and of great use in cutting off branches from trees. When walking, the Beaver looks remarkably awkward, as its hind feet are more suited for swimming than walking; another cause for this is the thickness of its body.

2. *Habits*.—The Beaver can remain for a long time under water. They build their houses in rivers, lakes, or creeks, more generally the two latter, as they require running water to carry down the building materials. They generally choose a spot where the water is so deep that the bottom will not freeze in the winter. When the water is shallow, or liable to be drawn off, the Beaver is taught to make a dam across the water at a convenient distance from its house. This is formed of twigs of trees mixed with mud and stones so as to make it very strong. These are sometimes placed just across the stream, but, where it is rapid, they are considerably curved, and rounded towards the water; this prevents the water from running, and makes the bed deeper. The house is formed of the same materials as the dam, viz. twigs, mud, and stones; and the size is in proportion to the number of inhabitants, which is usually four old and six young ones;

sometimes there are more. The house is of much ruder construction than the dam. When it is large it is composed of several compartments, each having its own inhabitants, and its own door: these are connected by passages under water, so there is no connexion existing unless they like. The whole community join in the labour of building. The wood is laid across and across upon the ground without any order, further than leaving the middle hollow; when any unnecessary branch projects inwards, they cut it off with their teeth. From the sides of the river or creek near which they are building they take mud and stones, which they mix with the wood; this is continued until the house is finished. When done, the house has a dome-like appearance, the walls are several feet in thickness, and rise about six feet above the water and reach nearly as much underneath. The only entrance is under water below a projection known by hunters as the "*angle*." It is very amusing to see them carrying the mud and stones they require, which they do under their throats, keeping them there by means of their fore paws. The branches of trees they drag along by their teeth. At the beginning of every winter, just as the frost sets in, the Beaver covers its house over with mud, which, when frozen, is as hard as stone, and prevents other animals breaking in.

The food of the Beaver consists of a large root, something like a cabbage-stalk, which grows at the bottom of rivers and lakes. It also eats the bark of the willow and other trees. Near the entrance to its house it lays up a store of winter provisions. This consists of twigs of trees, and over every layer they put mud and stones to prevent its rising above the water.

The Beaver is easily tamed, but its propensity to build is never lost, and when in captivity it will use brushes, baskets, boots, or anything it can get, and with them form a rude house.

3. *Mode of hunting*.—Persons engaged in this must

be well acquainted with its mode of life, as it makes a hole in the bank near its house, and when any one disturbs its house it retires into this hole. When the hunters wish to catch the Beavers in a small creek or river, they first stake the river across to prevent the Beavers escaping. Every man then takes an instrument, with which to break the ice, fastened to a stick five or six feet long, which is called a "chisel;" with this he knocks the ice as he walks along the bank, and can tell by the sound where the holes are. When they think they have found one, they cut a hole through the ice large enough to admit an old Beaver. While some are employed doing this, others are engaged in pulling down the house, which, owing to the thickness of the walls, is often a work of great difficulty. When the Beaver finds them attacking his house, he goes to the hole he has made in the bank; the hunters, from the motion of the water, know when he goes, and they then fasten up the hole with stakes, and pull out the Beaver either with the hand or a long hooked stick. The Beaver is sometimes taken by means of a net, and sometimes trapped.

III. *Uses.*—This is a very useful as well as interesting animal, and in considering the uses, we take,

1. *Its flesh*, which is much valued as food, and by the Indians and Canadians considered a great luxury, especially when roasted with the skin on, after the hairs have been singed off. When an Indian chief makes a great feast, he always likes to have a roasted Beaver as one dish. It is said to taste very much like pork, but the lean is dark coloured and the fat oily. I do not think we should like it very much were we to taste it.

2. *Its skin*, used for making hats and bonnets.

IV. *Moral Lesson.*—From observing the habits of the Beaver, we may learn a lesson of industry, and the folly and wickedness of wasting that time which God has given us, as He intended us to improve it and not waste it. The Beaver always lays by a store of pro-

visions for the winter, and we should not only think of present enjoyments, but of what will become of us when all these things have passed away, and try to lay up our treasure "where neither moth nor rust doth corrupt, and where thieves cannot break through and steal," as our Lord commanded His disciples to do.

FEMALE CLOTHING FOR THE POOR.

When in the Machinery Room in the Great Exhibition one could not help noticing the many processes through which the commonest articles of clothing have to pass before they are fit for our use, and reflecting how many things are wasted through bad management, as many schoolmistresses think that if girls are taught to sew neatly that is quite sufficient, and do not give them instruction in the kind of clothing they ought to purchase.

This lesson is intended for the eldest girls in a National School—many parts of it will be elicited from them.

1. Clothing for children.—The under-clothing of babies should be of rather fine soft white calico. For a baby's under-dress $\frac{3}{4}$ of a yard will be sufficient, and a calico at about 4*d.* a-yard will do very nicely, so a set of six will cost 1*s.* 6*d.* For children from 2 and upwards unbleached calico is the best, it being cheaper and stronger than white. A good calico of this description may be bought for 3 $\frac{1}{4}$ *d.* a-yard, and the quantity will be according to the size of the child, generally speaking one about 4 or 5 will require 1 $\frac{1}{2}$ yard for one, which will cost 5 $\frac{1}{4}$ *d.*; for one about 8 or 10 years old 2 yards will be required, costing 7*d.* each.

Night-dresses should also be made of this calico; for a child of 3 or 4 years old 2 yards will be required, costing 7*d.*; and for one of 7 or 9 years 2 $\frac{1}{2}$ yards will be sufficient, and will cost 8 $\frac{1}{4}$ *d.*

I think it much better for all children to sleep without night-caps, for various reasons; it is much more healthy, as the head ought to be kept as cool as possible, more economical, and saves a great deal of trouble in washing and ironing; the two latter reasons will be of great consequence to poor women.

We now come to garments made of flannel. In purchasing this, persons very often err in thinking that it is best to buy a cheap article. When a flannel is common, it is made up of a great deal of cotton mixed with the wool; this causes the flannel to shrink when washed, and it also wears out much more quickly. It is, therefore, best to buy a pretty good flannel, and one may be got for about 1s. a-yard. The list should be taken care of, as it may be useful, as we shall see by-and-by. For a child of 1 or 2 years old 1 yard will be required; for a child of 4 years, $1\frac{1}{2}$ yard will be sufficient; and for one of 8 or 9, $2\frac{1}{4}$ yards. This is allowing for a tuck, which should always be made, to allow for shrinking as well as for the growth of the child.

Upper petticoats can be made from the skirts of stuff frocks, the bodies and sleeves of which are worn out. The skirts should be taken off the bodies, and put into a calico band, which ought to be fastened by a button.

Pinafores are best made of a good dark print, about $5\frac{1}{2}d.$ a-yard. For a child of 2 or 3 years old $\frac{1}{2}$ a yard will be sufficient; $\frac{3}{4}$ for one of 5 or 6; and 1 yard for one about 9 or 10. Bigger children will require them in proportion.

Dresses for summer are best made of print; and in buying this, be sure to have it good; one about $6d.$ a-yard will last as long as two common ones. One yard will be sufficient for a baby's frock; $1\frac{1}{2}$ for a child of 2 or 3; and $3\frac{1}{4}$ for one of 8 or 9.

For winter dresses the best material is a good British merino, about 1s. a-yard, and as it is about the same width as the wide print recommended, the quan-

tities required will be the same. The skirt should be lined with an old print dress, also the sleeves, and for the body $\frac{1}{2}$ a yard of common unbleached calico, at about $2\frac{1}{2}d.$ or $3d.$ a yard.

To wear out of doors, capes and sleeves like the dresses are best, or capes made of the list which is taken from the flannel, sewed neatly together. Merino capes, made and lined, will be very warm for the winter, or instead of this a wool shawl may be got; it will cost about $7s.$, but will last for several winters, and when washed will look as good as new. For a small cape and sleeves 1 yard will be required, and for a large one $1\frac{1}{2}$ or 2 yards. When made for the winter, they will require from 1 to 2 yards of glazed lining, according to the size; this will cost $3d.$ a-yard.

Stockings should be knitted by elder children, as they are much stronger than the woven ones, are cheaper, and afford employment for children, teaching them habits of industry and economy, and keeping them from mischief. A good strong worsted will cost $2d.$ an ounce; a pair of socks for a child will require about 4 ounces; and a pair of stockings for a child, 8 or 10; and larger ones in proportion.

Boots are far better than shoes, as the latter are liable to be run down at the heel, which, beside looking very untidy, wears out the stockings very quickly. The price for strong boots varies from $2s.$ to $5s.$ a-pair.

Stays made of jean, with cords stitched in them, and buttons down the back, are the cheapest, neatest, and strongest. For a little child $\frac{3}{4}$ yard will make two pairs, and for a child about 8 or 9, $\frac{1}{2}$ a yard will be required for one pair. The price of the jean will be about $8d.$ a-yard.

Bonnets made of print, run with cords, and having a large curtain behind, (which in summer will serve for a cape,) are the best. The quantity required will vary from $\frac{1}{2}$ to 1 yard, according to the size. For best, a common straw may be got; they will cost from

6*d.* to 1*s.* 6*d.* each, and will require 2 yards of plain dark ribbon to trim it with. The ribbon will cost about 5*d.* or 6*d.* per yard.

II. *Clothing for women and elder girls.*—The same materials will be used as for children, the difference will be in the quantity required. For a woman's under-dress 3 yards of calico will be wanted, and about the same quantity for a night-dress. For night-caps, $\frac{1}{2}$ yard of fine white calico, about 4 $\frac{1}{2}$ *d.* or 5*d.* per yard, with $\frac{1}{4}$ yard of jacconet muslin, at 6*d.* per yard, will make three; the strings made of hemmed calico. For a flannel petticoat, 3 or 3 $\frac{1}{2}$ yards of flannel will be required, allowing a tuck in it. Petticoats made from old stuff dresses, like those of children.

Dresses for summer, made of print.—6 yards will be required of the wide width, and of narrow about 9 yards. For winter dresses, the same merino as the girl's; a woman will require about 6 or 7 yards. A good warm shawl may be got for 8*s.* or 10*s.* For aprons print is best, as it is more easily washed than anything else; 1 yard will make an apron.

Stays made at home are much stronger and cheaper than bought ones; 1 $\frac{1}{2}$ yard of jean, at 8*d.* per yard, and 1*s.* for other things: thus we see the materials will only cost 2*s.*

Kerchiefs for the neck—a square muslin one will cost about 6*d.*, and when cut across and hemmed will make two. For best, a square of cambric muslin, 1 yard, which will be about 6*d.*, will make two. Caps for common use should be made of checked muslin; 1 yard at 8*d.*, with $\frac{1}{2}$ yard of jacconet, at 9*d.* per yard, will make three caps. For best caps, plain washing net, neatly trimmed with a small quantity of gauze ribbon, at about 2*d.* or 3*d.* a-yard.

Bonnets for common use, made of print. For best, a straw, which will cost about 1*s.* 6*d.* or 2*s.*, trimmed with a plain dark ribbon—3 yards will be sufficient.

Stockings knitted—about 12 ounces will be re-

quired; and women's boots will be about 6s. or 7s. per pair.

Having got clothes, the next thing is to make them last as long as possible, and the way to do this is to mend them well. Before the clothes are washed they should be all looked over and mended, all strings, &c. being carefully attended to. Stockings should of course be mended after they are washed, but the thin places should be neatly darned as well as the holes, as we must remember the old proverb, "A stitch in time saves nine."

DOMESTIC ECONOMY.

SEVERAL RECIPES AND DIRECTIONS FOR A NURSE.

The beautiful specimens of arrow-root, sago, and tapioca, which may be seen in the Exhibition, have been remarked as suggesting useful information for a lesson; and, therefore, as these are so necessary for the support and comfort of the sick, a few hints are added in connexion with them, which may be useful to a young person just entering a family in which she will have to attend the sick.

I. *Arrow-root*. — 1. *Description*. — This is a substance like flour, which is obtained from the root of a plant growing in the East and West Indies. (Point out the situation of these islands on the map.)

2. *Preparation for use*. — The root of the plant must be carefully washed, in order to remove all the earth which will be left on it when taken from the ground; having been washed, the root is next beaten to a pulp, *i. e.* it is beaten till it is quite soft; this should be done in a wooden vessel. After this, the pulp is mixed with pure water, and by this process the fibrous or stringy parts are removed, — partly by the hand, and partly by straining through a hair-sieve. When this has been removed, the floury substance is

left to sink to the bottom of the vessel, after which the water is drawn off. The floury substance which sank to the bottom is dried by being exposed for some time to the sun and air. When perfectly dry, it is packed in cases or boxes, and then it can be kept uninjured for many years. A great deal of an inferior floury substance improperly called arrow-root is now made in England.

3. *Preparation for food.*—A dessert spoonful of arrow-root will make half-a-pint. The powder or arrow-root should be put into a basin, and enough cold water added to make it into a soft paste; after this, half-a-pint of boiling water should be gradually poured upon it, taking particular care to stir it briskly all the while, and then to let it boil for a few minutes.

The flavour may be greatly improved by adding wine or lemon-juice, &c., to suit the taste of the sick person; but neither wine nor lemon-juice should be used except by the doctor's directions, as they might produce much mischief otherwise.

II. *Sago.*—1. *Description, and way in which procured.*—Sago is a floury substance, obtained from the stem of several palms growing both in Asia and America. It forms the chief article of food for the people of the East Indies. A very fine sago has for the last few years been obtained from the beautiful palm-trees of Brazil, and sent to Europe. Sago is a kind of starch, which collects in the plant for the nourishment of the flowers and fruit, and therefore God has so wisely ordered it that at the time when the flowers and fruit appear it exists in the greatest abundance. It is at this time that the tree is cut down near the root, and then the whole trunk is divided into pieces five or six feet long. After this, a man cuts off part of the hard wood in slices, but when he comes to the pith, he cuts across it, leaving a part at each end uncut; when this part is taken out, a kind of trough is left into which the pulp is put, and then prepared nearly in the same way as arrow-root.

2. *Preparation for food.*—Before being used for food sago should be soaked for an hour in cold water, to take away the earthy taste which it is so often found to possess. One table-spoonful should be put into a saucepan with nearly a pint of water, and allowed to boil till it is perfectly clear. It can then be flavoured according to taste.

Sago-milk is made in the same manner, only it is boiled with new milk instead of water.

III. *Tapioca.*—1. *Description.*—It is also a floury substance, made from a plant which grows in South America. After the juice has all been carefully pressed out, the flour is washed, and when dried on hot plates is called tapioca. It consists of small irregular grains or lumps, which by being soaked in water can be partly dissolved. Tapioca is very light and easily digested, and these qualities make it very useful as food for the sick. The spurious tapioca, made of gum and potato-starch, is distinguished from this by being in larger grains, and more easily dissolved in water.

2. *How made into food.*—Soak a table-spoonful of tapioca for two hours in cold water, then put it in a pint of water, and let it simmer over a fire till it is quite clear. It may be flavoured in the same manner as arrow-root or sago.

A few facts may be mentioned, connected with this subject,—

I. *The conduct and appearance of the nurse.*—She should be careful to be kind both in her voice and manner; she must avoid all hastiness of temper, and under every circumstance she should be quiet and gentle—always ready to meet the wishes of the patient, without giving him the least trouble. All noise with shoes or doors should be carefully avoided, as they may greatly irritate the patient. She should be very careful to follow the directions of the physician, and be very cleanly in her person and dress.

II. Be careful to keep everything perfectly clean, remembering that it is much easier to keep a place clean by constantly attending to it, than it is to get it clean when it has been left untouched for a length of time. Always open the windows of the room to let in fresh air, unless the peculiar circumstances of the patient prevent it.

III. Great care should be taken to arrange the bed-curtains and window-blinds so as to let in as much air as possible, and yet to prevent the light from shining upon the face, it being very injurious to the eyes. And,

IV. Be sure to have everything in readiness when required, not having to fetch it from any distance when it is wanted. This, as well as the preceding hints, if attended to, will greatly add to the comfort of the sick, and also to that of the nurse.



